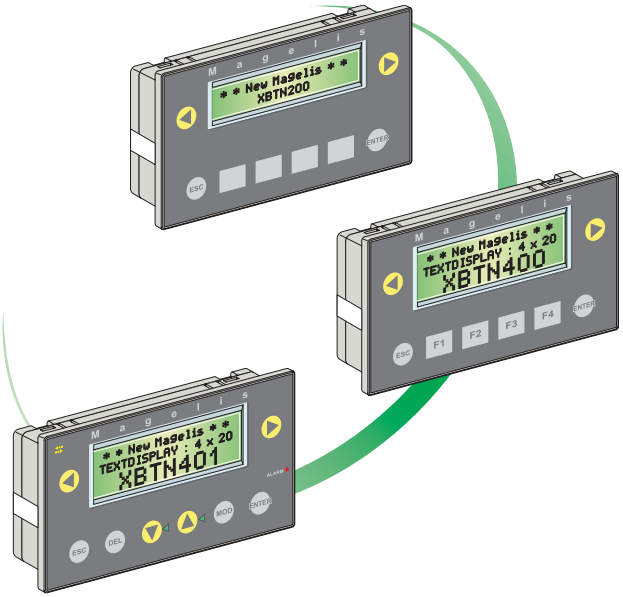
User Manual
January

2003

Telemecanique Compact Display Units Magelis XBT N

Software
XBT L1000 ver 4.20



Telemecanique

Schneider Electric

Conventions

The meaning of the pictograms used in this document is explained below:

Indicates an example.

Indicates that failure to follow the instructions or ignoring these warnings will cause serious injury or death of personnel, and/or serious damage to the equipment.

Indicates that failure to follow a specific instruction may cause minor injuries and/or damage to the equipment.

Indicates information concerning the communication indicator light.

Indicates information concerning indicator lights in general.

Represents a button on the XBT-L100• program toolbar.

Represents a button on the terminal.

A table at the bottom of each page in chapters B and C specifies whether or not the point discussed in the paragraph is relevant to the display units.

Example:

XBT N200	XBT N400	XBT NU400	XBT N401

This blank table indicates that the point discussed on the page is relevant to all the display units.

XBT N200	XBT N400	XBT NU400	XBT N401
No indicator lights			

This table indicates that the information described on the indicator lights is only relevant to XBT N401 display units.

General Contents

Presentation of the XBT N display unit and the XBT L100• program.	**Introduction**	A
What is a display unit for and how is it used?	**Using the XBT N display unit**	B
Software functions for creating an application.	**Detailed description of the XBT L100• program**	C
As a beginner: creating your first application.	**Example of a simple application**	D
Troubleshooting, error messages, terminology.	**Appendices**	E
You are looking for a particular word.	**Index**	I

Chapter A
Introduction

Contents

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A

Contents

Presentation of the range

The main functions of Magelis compact display units are:
- **Displaying** data issued by the control system
- **Modifying** control system parameters
- **Controlling** a process using discrete commands

These display units communicate with PLCs via an integrated serial link in point-to-point mode (or multipoint for XBT N401s and NU400s). The communication protocols supported are Unitelway and Modbus which also supported by the PLCs.

Overview of the range:

RANGE	*CHARACTERISTICS*	*DISPLAY*	*MODE*	*FRONT PANEL*
XBT N 200	*- 5 VDC power supply via the PLC* *- Point-to-point mode link only* *- Unitelway, Modbus protocols* *- No indicator lights*	*2X20 alphanumeric*	*Input* *or* *Control*	
XBT N 400		*4X20 matrix (character mode only)*		
XBT NU 400	*- 24V DC power supply* *- Preloaded application(1)* *- Point-to-point, multipoint, multidrop mode link* *- Modbus protocol only* *- No indicator lights*			
XBT N 401	*- 24V DC power supply* *- Point-to-point, multipoint, multidrop mode link* *- Unitelway, Modbus protocols* *- Indicator lights*			

Point-to-point, multipoint, multidrop modes: see Chapter B, § Control system architectures, page 15
Mode: see § Presentation of the commands, page 7

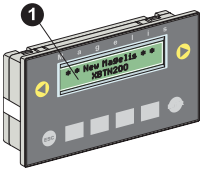
(1): For Tesys model U motor starter

1. XBT N display units

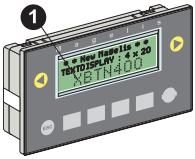
Description

XBT N display units include:

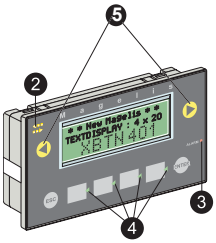
On the front panel

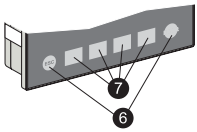


XBT N200



XBT N40• XBT NU400





1 - Backlit LCD display

2 - Communication LED (XBT N401)

3 - "Alarm" LED (XBT N401)

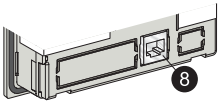
4 - PLC contrlled LEDs (XBT N401)

5 - Keys for link or contextual control

6 - Keys for service

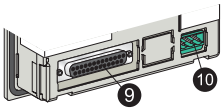
7 - Keys for function / service keys (configurable).

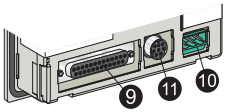
On the rear panel



XBT N200 /400

XBT NU400





XBT N401

8 - RJ45: serial link + PLC power supply

9 - SubD25 serial link

10 - 3-wire terminal block for 24 VDC power supply

11 - MiniDIN connector for printer (for future use)

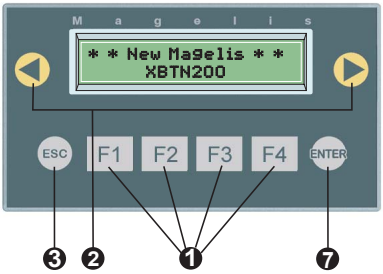
1. XBT N display units

Presentation of the commands

On the front panel XBT N display units have function keys and service keys (depending on whether the display unit has been customized as "control" mode or "input" mode). All these display units have the same user interface:

- 4 customizable service keys (input mode) which can be configured as function keys (control mode)
- 2 non-configurable service keys
- 2 link or contextual control keys:

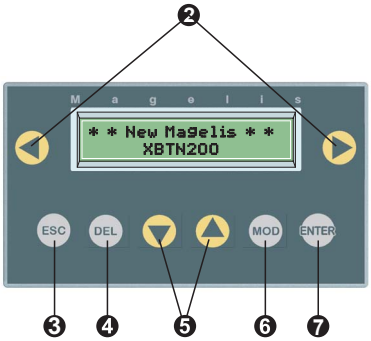
Display units in control mode



1 **Static function keys:**
- **Access to a page**
- **Impulse command**
- **Toggle command**

2 **Link or contextual control keys:**
- **Change page in a menu**
- **Activate the function associated with a functional link:**
  - **Impulse command**
  - **Toggle command**
  - **Variable write operation**

Display units in input mode:



2 **Link or contextual control keys:**
- **Change page in a menu**
- **Display current alarms**
- **Change digit in a variable field during input**
- **Activate the function associated with a functional link:**
  - **Impulse command**
  - **Toggle command**
  - **Variable write operation**

3 **Service keys**
- **Cancel an entry or an action**
- **Return to the previous page**

4 **- Clear the selected digit or field**

5
- **Go up, go down in a page (XBT N40• and NU400)**
- **Increment/decrement the selected digit**
- **Select a value in a selection list**
- **Increment, decrement the value of a variable field**

6
- **Select a field**
- **Go to the next field**

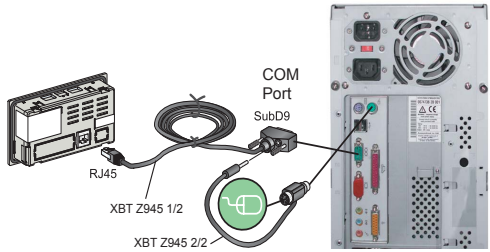
7
- **Confirm a selection or an entry**
- **Acknowledge an alarm**

Connection

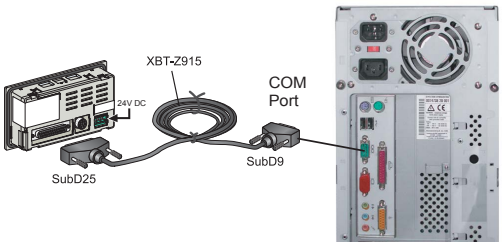
Magelis-PC link: application transfer

Power supply mode: powered by the PC

XBT N200 / N400
+
PC



Power supply mode: 24 VDC external power supply



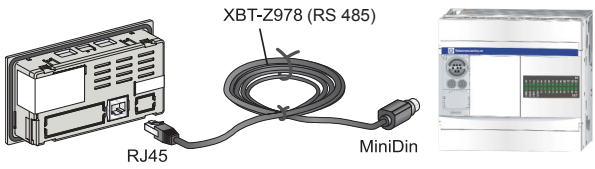
XBT N401/ NU400
+
PC

Magelis-PLC link: running

Power supply mode: powered by the PLC

XBT N200/400

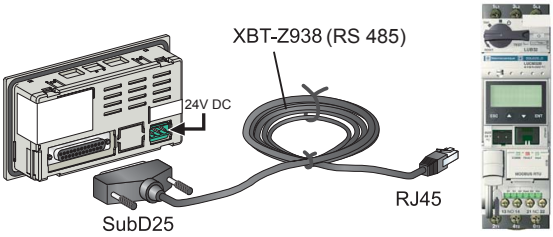
Twido/Micro/Neza
Premium/Nano



Power supply mode: 24 VDC external power supply

XBT N401/NU400

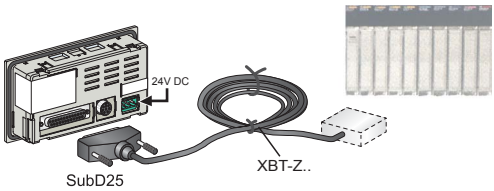
Altivar Tesys Model U



Power supply mode: 24 VDC external power supply

XBT N401/NU400

TSX 17/TSX series 7/ Twido/Micro/Neza/ Premium/Nano/Quantum/ Momentum/SCA62 (multipoint)



PLC	Cable
TSX17	**XBT Z958/Z928 (RS/485)**
Twido/Micro/Premium/Nano	**XBT Z968/Z9680 (RS/485)**
Quantum/984	**XBT Z9710 (RS/232C)**
Momentum	**XBT Z9711 (RS/232C)**
TSX47/67/87	**XBT Z948 (RS/485)**
SCA62 (multipoint)	**XBT Z908/Z908 (RS/485)**

1. XBT N display units

Characteristics

Type of display unit		XBT N200	XBT N400	XBT NU400	XBT N401
Environment					
Conformity to standards		IEC 1131-2, IEC 60068-2-6, IEC 60068-2-27, EN 61131-2, UL 508, CSA C22-2 no. 14			
Product certification		CE, UL, CSA, Class 1 Div 2 T5 (UL and CSA)			
Temperature	Operation	0 … +55 °C (32 °F … 131 °F)			
	Storage	-20 … +60 °C (-4 °F … 140 °F)			
Relative humidity		0 … 85% (without condensation)			
Degree of protection	Front panel	IP 65, according to IEC 60529, UL type 4, 4X			
	Rear panel	IP 20, according to IEC 60529			
Shock resistance		According to IEC 60068-2-27; semi-sinusoidal impulse 11 ms, 15g on 3 axes			
Vibrations		According to IEC 60068-2-6 , 10 to 57 Hz at 0.075 mm; 57 to 150 Hz 1 g for 3 hours per axis			
E.S.D.		According to IEC 1000-4-2, level 3			
Electromagnetic interference		According to IEC 1000-4-3, 10 V/m			
Electrical interference		According to IEC 1000-4-4, level 3			

Mechanical characteristics		
Mounting and fixing		Flush-mounted, fixed by 2 spring clips supplied pressure-mounted for panels 1.5 to 6 mm thick
Material	Screen protection	Polyester
	Front frame	Polycarbonate/polybutene terephtalate alloy
	Keypad	Polyester autotex UV

Electrical characteristics			
Power supply	Voltage	5 VDC via the serial link with the PLC	24 VDC
	Voltage limits		18 . . . 30 VDC
	Ripple factor		5% maximum

Operating characteristics					
Display unit	Type	Backlit LCD			
	Capacity	2 x 20 characters	From 4 x 20 to 1 x 5 characters (large size)		
Signalling		No LEDs			6 LEDs
Dialogue application	Nbr of pages	128	200		
Transmission medium (asynchronous serial link)		RS232/RS485			
Downloadable protocols		Modbus, Unitelway		Modbus	Modbus, Unitelway
Real-time clock		Access to the PLC real-time clock			
Connection	Power supply	Via the PLC link cable		Removable terminal block 3 screw terminals (pitch 5.08) Clamping capacity: 0.023 inch²	
	Serial link	RJ45 female connector (RS232/RS485)		25-pin female SubD connector	
	Printer link	No printer link			MiniDin

1. XBT N display units

Display units	Display unit with alphanumeric screen	Display units with matrix screen		

Display unit references	XBT N200	XBT N400	XBT NU400	XBT N401

Display			
Type	Backlit LCD	Backlit LCD 122 x 32 pixels	
Color	Green		Green/Orange/Red
Capacity	2 lines of 20 characters	1 to 4 lines of 5 to 20 characters	
Active screen area	2.91 x 0.47 inch	2.83 x 0.78 inch	
Size of characters	0.22 x 0.12 inch	0.17 x 0.11 to 0.68 x 0.46 inch	

Keypad	8 keys, 4 of which can be re-labelled	
Signalling	No LEDs	6 LEDs including 4 for the 4 central keys

Functions		
Number of pages (maximum)	128 application pages	200 application pages 256 alarm pages
Variables per page	8	40
Vertical page scrolling	no	yes
Number of lines per page	2	25
Representation of variables	Alphanumeric	
Fonts	Latin + Katakana	Latin + Cyrillic + Katakana
Languages	Number of languages only limited by the size of the memory	

Communication			
Serial link	RS232 C, RS485		
Protocols	Modbus, Unitelway	Modbus	Modbus, Unitelway

Programming software	XBTL1001M, XBTL1003M (using Windows 98, 2000 and XP)

2. The XBT L100• program

Presentation

XBT L100• is the configuration software for the Magelis range of operator terminals.
This software runs on computers using Windows 98, 2000 and XP operating systems.

Installation

In order to use XBT L100• software, the following minimum configuration is required:
- PC Pentium II 350 MHz
- 4x CD-ROM minimum
- Microsoft Windows 98, 2000 or XP
- 64 Mb RAM (128 Mb RAM recommended for Windows 2000/XP)
- 30 Mb of space available on the hard disk
- SVGA video card or better
- Mouse or compatible pointing device

To install the XBT L100• software, insert the CD-ROM in the CD-ROM drive and follow the instructions on screen.
If the installation program does not run automatically, select ***Run*** from the ***Start*** menu. Then, type “D:\SETUP.EXE” (where D: is your CD-ROM drive), then press ***Enter***. During installation, you will be asked which protocols and components to install.

Installation of the Xway driver is launched automatically after installation of XBT L100•. This driver is used to transfer applications between the PC and the display unit.
Once installed, this driver can be configured from the Windows control panel.

Functions

The XBT L100• configuration software is used to create applications that can be used by Magelis display units, in which it will be possible to:
- Create different types of page:
  - application pages
  - alarm pages

These pages can contain all sorts of variables predefined in XBT L100•. Different properties can be assigned to them.

- Configure function keys to perform commands on the machine, or call up application pages
- Import the list of PL7 (Junior/Micro/Pro) and Concept type PLC symbols, instead of double entry of variables

In addition, XBT L100• offers the possibility of monitoring created applications in the design office, without using a display unit or a PLC.
The simulation program is used in conjunction with the computer keys to test:

- navigation between pages
- entering variables
- displaying variables
- managing alarms
- etc.

Chapter B
Using the
XBT N display unit

Contents

Basic principle of man/machine dialogue. What is a display unit for?

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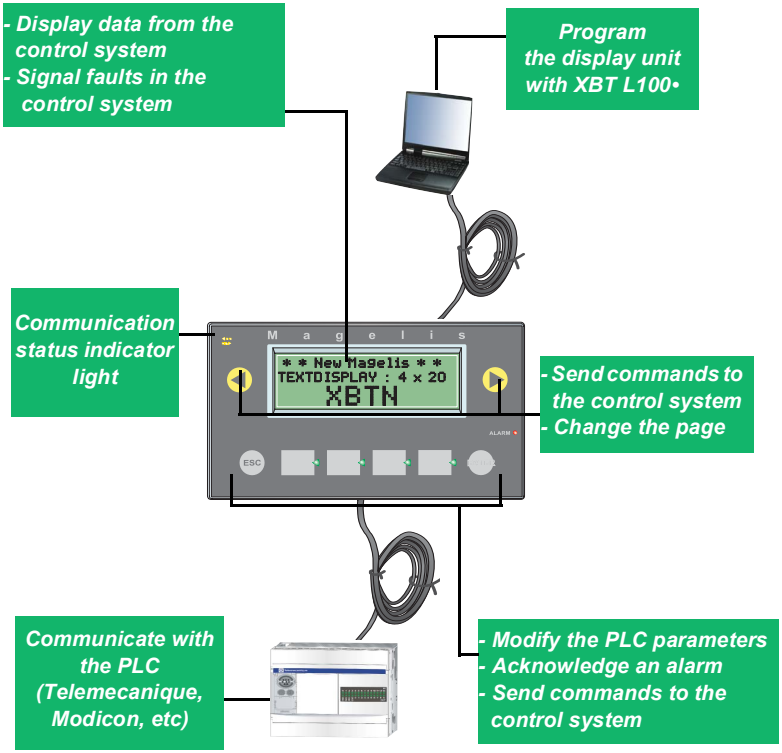
Human/machine interface


- Display data from the control system
- Signal faults in the control system
Program the display unit with XBT L100•
Communication status indicator light
- Send commands to the control system
- Change the page
Communicate with the PLC (Telemecanique, Modicon, etc)
- Modify the PLC parameters
- Acknowledge an alarm
- Send commands to the control system
M a g e l i s
** New Magelis **
TEXTDISPLAY : 4 x 20
XBTN
ESC
ALARM

Depending on the display unit chosen, the keypad will either be in control mode, or input mode (see Chapter A, § Presentation of the commands, page 7). The button labels are therefore interchangeable.

XBT N200	XBT N400	XBT NU400	XBT N401
No indicator lights			

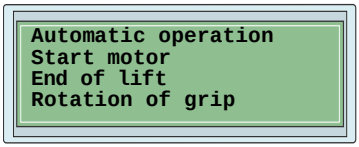
1. Introduction: Operating the display unit

Applications created in XBT L100• can be associated with:
- production monitoring
- preventive maintenance
- corrective maintenance
- process control

Production monitoring

Display process status messages:

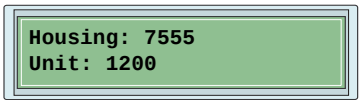
Ex.



Preventive maintenance

Ex.

Counting parts for production monitoring:



Corrective maintenance

Ex.

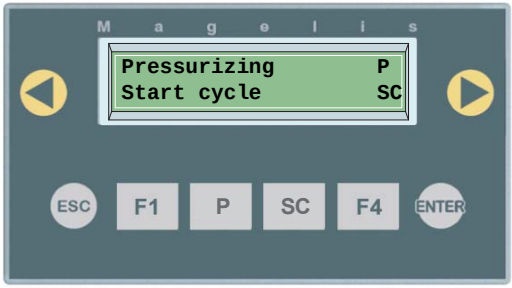
Indication of process faults:

XBT N200	XBT N400	XBT NU400	XBT N401

1. Introduction: Operating the display unit

Process control

Process control via configurable function keys:



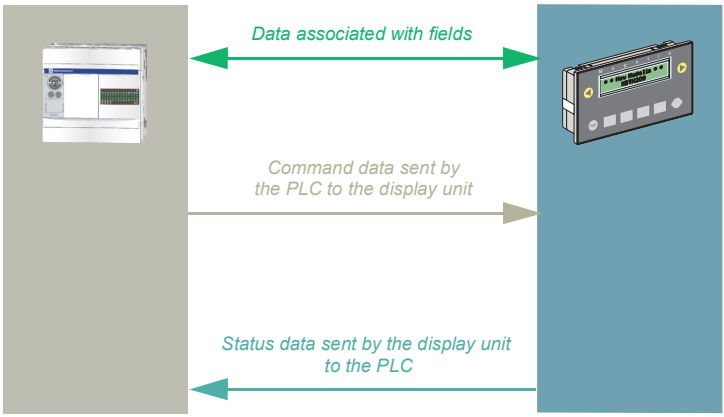
As indicated on the display unit screen, ***pressurizing*** is monitored by the **P** button and ***start cycle*** by the **SC** button.

B

XBT N200	XBT N400	XBT NU400	XBT N401
Display unit in "Control" mode only			

Dialogue between the PLC and the display unit

Man/machine dialogue between the Magelis display unit and the PLC consists of an exchange of data between the 2 devices.
Various types of data can be exchanged.


Data associated with fields
Command data sent by the PLC to the display unit
Status data sent by the display unit to the PLC

CAUTION

LOSS OF CONTROL

- Loss of communication between the display unit and PLC will result in partial or complete loss of control.
- Monitor display unit.
- Check "Communication control" word in dialogue table via PLC program

Failure to follow this instruction can result in injury or equipment damage.

For more information, see Chapter C, § 4. Dialogue table, page 43

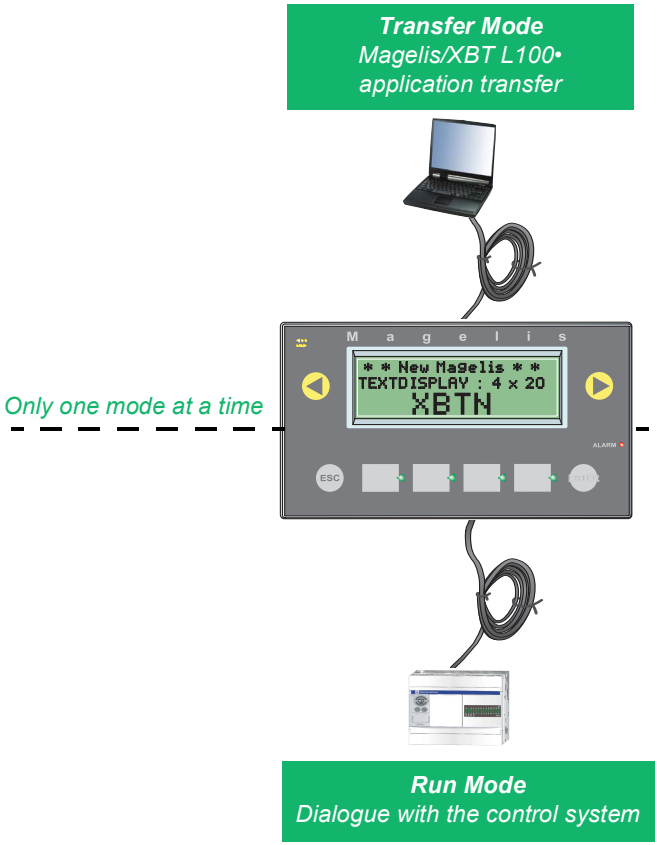
XBT N200	XBT N400	XBT NU400	XBT N401

Operating modes

Magelis display units have 2 exclusive operating modes:

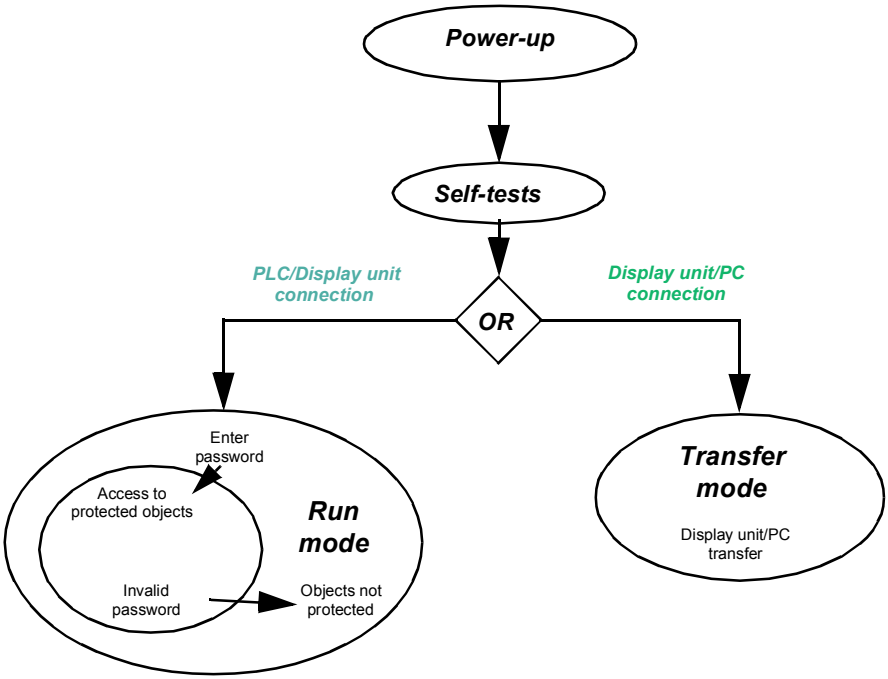
- **Transfer mode** enabling dialogue applications to be transferred between the XBT L100• program and the Magelis display unit.

- **Run mode** enabling exchanges between the display unit and the control system (controlling the latter).



XBT N200	XBT N400	XBT NU400	XBT N401

On power-up, the display unit automatically detects the exchange mode (only one mode at a time) depending on the equipment connected on its serial link.

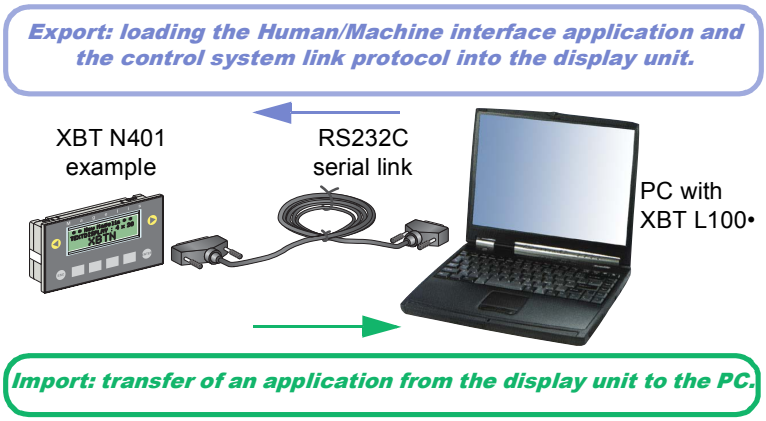


Transfer mode

This is the mode in which the display unit communicates with the XBT L100• configuration software. It is used to transfer the application in both directions.

XBT N200	XBT N400	XBT NU400	XBT N401

Connecting the PC and the display unit using the communication cable is sufficient to switch the display unit to transfer mode. No other operator action on the display unit is necessary in this mode.


Export: loading the Human/Machine interface application and the control system link protocol into the display unit.
XBT N401
example
RS232C
serial link
PC with
XBT L100•
Import: transfer of an application from the display unit to the PC.

Cable connection
see Chapter A, § Connection, page 8

Procedure with XBT L100•
Select the ***Transfer/Export*** menu (or ***Transfer/Import***).

Communication indicator light

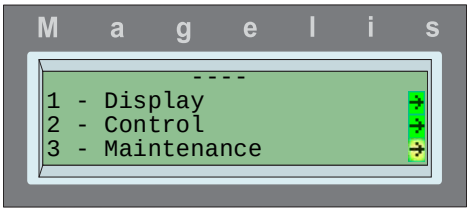
- indicator light off: no cable or communication
- indicator light blinking: exchanges between the PC and the display unit

XBT N200	XBT N400	XBT NU400	XBT N401
No indicator lights			

Run mode

Run mode is used to control the control system:
- Page display
- Entry/Modification of process parameter values
- Process control (discrete)
- Viewing and acknowledgement of alarms

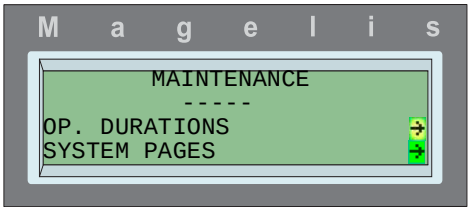
Example: Display of an application page



Go to the desired page

Access the page

After pressing the key, the operator accesses the desired page.



(For more information on the display of system pages, see § "6. System pages", page 38)

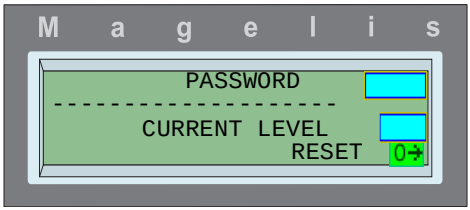
XBT N200	XBT N400	XBT NU400	XBT N401
No management of alarms No access to the "Menu" page	No access to the "Menu" page in "Control" mode		

Protection

To prevent unauthorized persons from reading and writing data, it is possible to protect:
- access to pages
- modification of fields
- control via functional links

If an operator does not have authorization:
- Protected pages no longer appear in the list of pages
- Protected fields behave as if they had been configured as read-only

The password is entered via the "Password" system page. A navigation link to the "password" system page is required on one of the application pages (For more information on the display of system pages, see § "6. System pages", page 38).



There are three levels of access: A, B and C.
These passwords are defined in XBT L100•. A password consists of four alphanumeric characters (default value 1111).

CAUTION

UNAUTHORIZED ACCESS

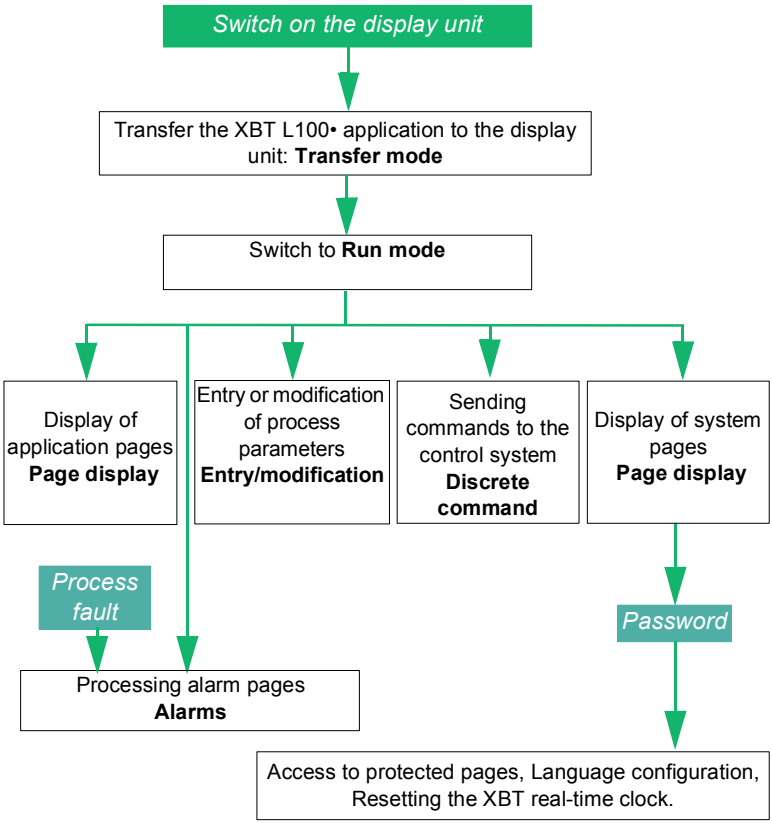
A display unit must only be installed and used by authorized personnel.

Failure to follow this instruction can result in injury or equipment damage.

XBT N200	XBT N400	XBT NU400	XBT N401
No access to the password page	No access to the password page for display units in "Control" mode		

Organization of Magelis functions

Magelis (or XBT) display units have a certain number of functions.
The flowchart below shows these different functions.


Switch on the display unit
Transfer the XBT L100• application to the display unit: **Transfer mode**
Switch to **Run mode**
Display of application pages **Page display**
Entry or modification of process parameters **Entry/modification**
Sending commands to the control system **Discrete command**
Display of system pages **Page display**
Process fault
Password
Processing alarm pages **Alarms**
Access to protected pages, Language configuration, Resetting the XBT real-time clock.

XBT N200	XBT N400	XBT NU400	XBT N401
No alarm management			

Control system architectures

Protocols

Communication between the display unit and connected equipment is achieved by means of a communication protocol which is chosen when creating the application in XBT L100•:

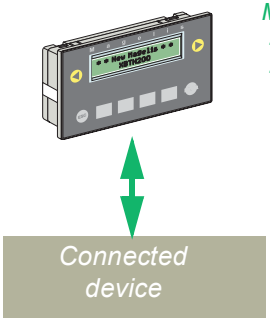
The protocols available for the range enable communication with the Schneider range of PLCs, specific equipment (variable speed drives), etc.

These protocols are Unitelway and Modbus.

There are several types of architecture which enable one display unit to be linked to several devices or several display units to one device.

Point-to-point connection

One display unit linked to one device.

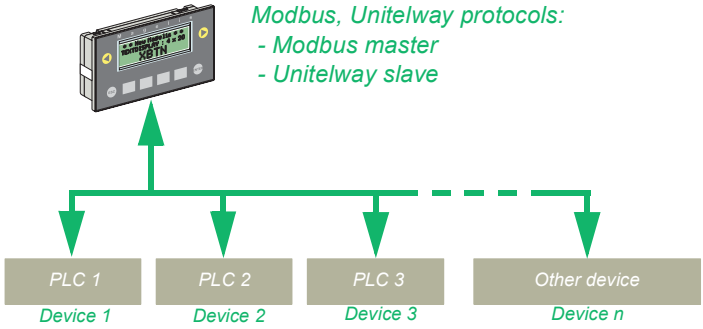


Modbus, Unitelway protocols:
- Modbus master
- Unitelway slave

XBT N200	XBT N400	XBT NU400	XBT N401
In Unitelway, a slave number has a fixed value of 4		Modbus protocol only	

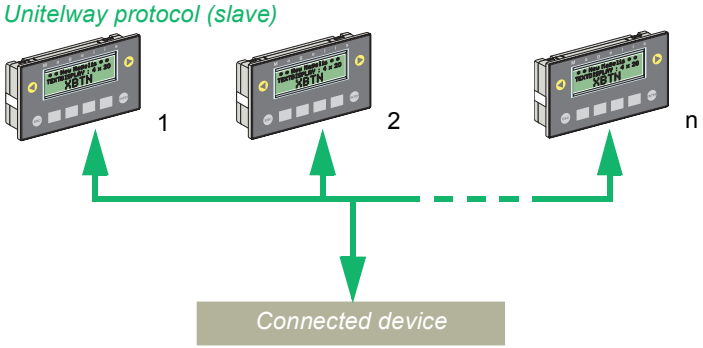
Multipoint connection (XBT N401/NU400)

One display unit linked to several devices (15 max)



Multidrop connection (XBT N401)

Several display units linked to one device (Does not apply to ModBus)



XBT N200	XBT N400	XBT NU400	XBT N401
No multipoint connection No multidrop connection		Modbus protocol only	

Principle of application pages

Definition

Application pages are pages designed to provide information about the process being run. They also serve to clarify any operation that the operator might have to perform in a given context.

These pages can be displayed by the control system (all) and by the operator (as defined during configuration) (see § Display of an application page, page 31).

It is possible to link application pages together so as to create authorized sequences during operation (see Chapter C, § Functional links, page 40).

There is protection to prevent an unauthorized operator from displaying protected pages (see Chapter C, § Protecting a page, page 23)

XBT N200	XBT N400	XBT NU400	XBT N401

Principle of system pages

Definition

System pages are predefined pages which are used to perform operations relating to the terminal "system".

In run mode, these pages can be accessed in the same way as application pages.

System pages are pages processed as if they were application type pages. Hence they are stored with the application pages in the developed application file.

There are 3 types of system pages:
- Normal system pages which can be called by accessing an application page (numbers 1 to 100)
- System pages which cannot be called by accessing an application page (numbers 101 to 200)
- Popup/message system pages which cannot be called (numbers 201 to 300)

(For more information on the display of system pages, see § "6. System pages", page 38)

The advantage of being able to view these pages with XBT L100• is that system messages can be translated or customized.

XBT N200	XBT N400	XBT NU400	XBT N401

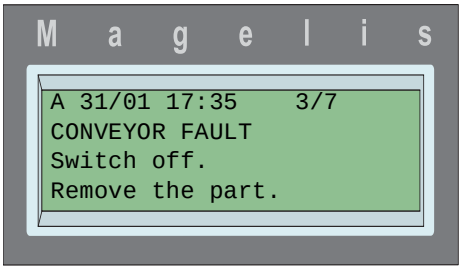
Principle of alarm pages

Objective

An alarm page has the same characteristics as an application page with respect to:
- the text
- the field

The advantage of an alarm page lies in its event-triggered display. Each alarm page has an associated dialogue table word bit (see Chapter C, § 4. Dialogue table, page 43).
If the bit is at state 1, the page is displayed and the text blinks **.**

Ex.



Advantages in run mode

- When a fault appears, it is often the consequence of other faults. MAGELIS products, due to their **priority** system, can display the most important fault, ie. that presenting the highest risk to the process.
- The appearance of any fault is **time-stamped**.

XBT N200	XBT N400	XBT NU400	XBT N401
No alarm management			

The actual display of an alarm depends on the priority which it has been allocated (see § "Display priority", page 20).

Alarms which have occurred on the process are stored in an "Alarm list".

- The "Alarm" indicator light continuously informs the operator about the state of the alarm list:
  - Off: the alarm list is empty.
  - Blinking: the alarm list contains alarms which have appeared since the alarm list was viewed (new alarms).
  - On: the alarm list contains alarms which occurred before the alarm list was viewed (alarms already displayed).

Display priority

A priority can be associated with each alarm page. An alarm page has priority over an application page and a system page. An alarm page does not have priority over a value which is currently being entered.

Different alarm pages may have different priorities. There are 16 possible levels of priority (the lowest display priority being priority 16).

Exception for priority 0

If priority 0 is allocated to an alarm page, when the alarm appears on the process:
- The alarm page is not displayed, but stored in the alarm list, thus the current display will not be disturbed.
- The alarm indicator light blinks to signal the alarm.

When an alarm is activated, it is stored in the alarm list by the display unit.

XBT N200	XBT N400	XBT NU400	XBT N401
No indicator lights No alarm management	No indicator lights		

Storage principle in the alarm list:

If the alarms have equal priority, they are stored from the most recent to the oldest .

- If the display unit is available (ie. not occupied by a higher priority display), the most recent is displayed.

If higher priority alarms appear:
- They are stored at the top of the list.
- If the display unit is available (ie. not occupied by a higher priority display), the highest priority new alarm is displayed.

Acknowledgement of alarms

When designing pages, it is possible to define whether the alarm page should be acknowledged systematically by the operator or not (obligatory acknowledgement).

The alarm page is acknowledged on the display by pressing ENTER. The alarm message changes to a fixed display.

Depending on the choice made, management of these 2 types of alarm is as follows:

1 - Alarms which must be acknowledged (obligatory)

An alarm which must be acknowledged remains in the alarm list until it is acknowledged by the operator, even if the cause of the fault has disappeared.

Advantage: Picks up transient faults (instability of a discrete sensor for example).

XBT N200	XBT N400	XBT NU400	XBT N401
No alarm management			

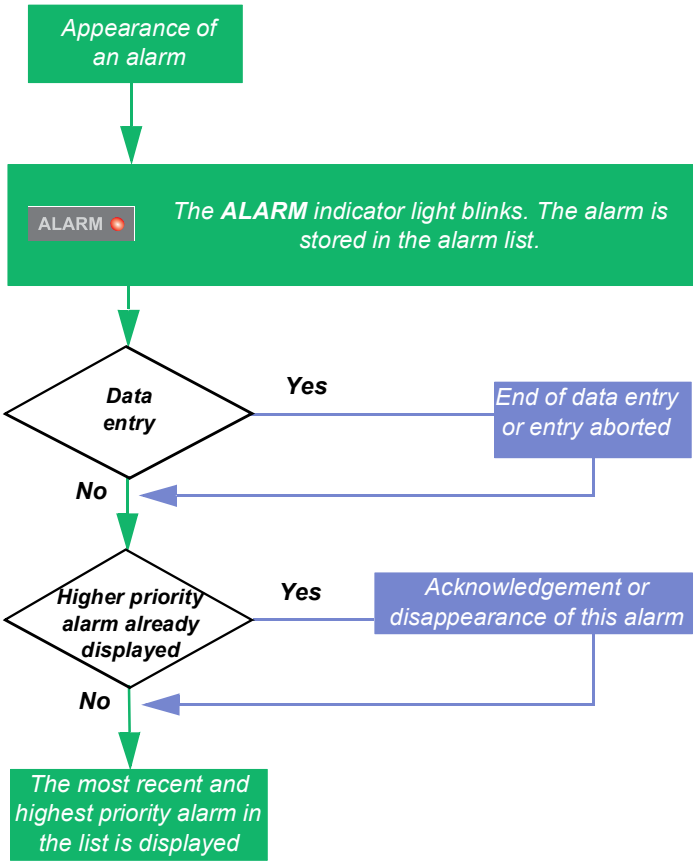
2 - Alarms which can optionally be acknowledged

An alarm which can optionally be acknowledged disappears from the alarm list as soon as the cause of the fault has disappeared, whether the alarm has been acknowledged by the operator or not.

Advantage: The display unit is not monopolized by displays of faults considered of minor importance to the application.

XBT N200	XBT N400	XBT NU400	XBT N401
No alarm management			

Display principle of alarm pages


Appearance of an alarm
ALARM
The ALARM indicator light blinks. The alarm is stored in the alarm list.
Data entry
Yes
End of data entry or entry aborted
No
Higher priority alarm already displayed
Yes
Acknowledgement or disappearance of this alarm
No
The most recent and highest priority alarm in the list is displayed

XBT N200	XBT N400	XBT NU400	XBT N401
No indicator lights No alarm management	No indicator lights		

Display unit self-tests

Self-test on power-up

When the display unit is powered up, the following self-tests are performed:

ELEMENT TESTED	*TEST PRINCIPLE*	*FAILURE CRITERION*	*ACTION IN EVENT OF FAILURE*
The working memory (Ram)	Writing/reading	Value read different from written value	Operation impossible: STOP
The Firmware	Checksum calculation and checking	Calculated checksum <> stored checksum	Operation impossible: STOP
The application memory	Checksum calculation and checking	Calculated checksum <> stored checksum	Running impossible: Recording compulsory

Continuous self-test

A continuous self test controls that the program operates correctly (watch dog).

NOTE: **If a problem is detected which prevents operation of the product, the display unit extinguishes all its indicator lights, stops working and displays an error number (in so far as the detected fault permits it to do so). If the same problem appears after the display unit is switched back on, inform the maintenance department of this error number.**

XBT N200	XBT N400	XBT NU400	XBT N401

Key functions

Keys	Key function
	- Enter a page number, a password or a variable field value. - Select a field or go to the next field each time MOD is pressed (left to right and top to bottom).
	- Exit the alarm display - Return to the previous page - Exit an entry without acceptance of the value entered (1)
	- Change page in a menu - Display current alarms - Change digit in a variable field during input - Activate the function associated with a functional link: - impulse command - toggle command - writing variables
	- Go up/down within a page - Increment/decrement the selected digit - Increment/decrement the value of a variable field - Select a value in a selection list
	- Delete the selected digit or field
	- Confirm a selection - Confirm an entry - Acknowledge an alarm

(1) are memorised the first 16 pages only

XBT N200	XBT N400	XBT NU400	XBT N401

2. Keys and indicator lights

Indicator light functions (XBT N401)

Indicator light	*Color*	*Status*	*Meaning*
(Communication)	Yellow	- Off	- no cable or no communication
		- Blinking	- Communication OK
(Alarms)	Red		Alarm list:
		- Off	- empty
		- On	- alarms already displayed
		- Blinking	- new alarms not previously displayed
Input mode			
(Up/Down)	Green	- Off	- Key inactive
		- On	- Possibility of going up/down within a page (XBTN4xx)
		- Blinking	- Indicates the possibility: - of selecting a value in a list - of incrementing/decrementing the selected digit
Control mode			
(Indicator light for the 4 static function keys)	Green	- Off - On	These indicator lights are governed by the control system. Their state is determined entirely by the application program of the control system governing the display unit. As a result, their role can vary from one application to another: - signaling linked to the key (same type of role as the system LEDs above) - signaling the status or a fault of the component governed by the key

XBT N200	XBT N400	XBT NU400	XBT N401
No indicator lights			

Types of command

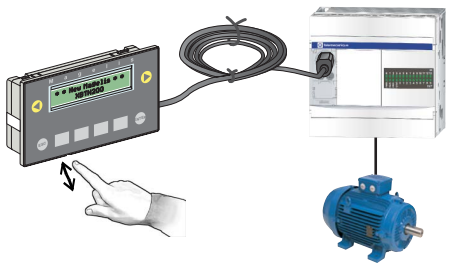
MAGELIS display units are used to send commands to the control system via function keys or functional links.

Impulse command

The control system is activated by pressing a function key (or functional link). If the key (or functional link) is released, the action stops.

Ex.

Motor command



Key	Bit
released	0
pressed	1
released	0

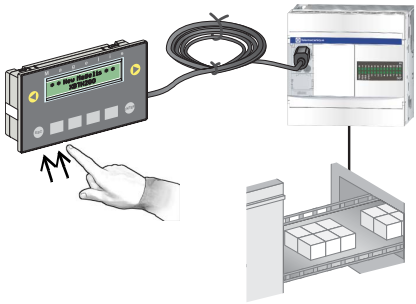
In the control system, the falling edge of the control bit should be monitored to control an action.

Toggle command

The control system is activated by pressing the function key (or functional link). If the function key (or functional link) is pressed again, the action on the control system stops.

Ex.

Conveyor forward command

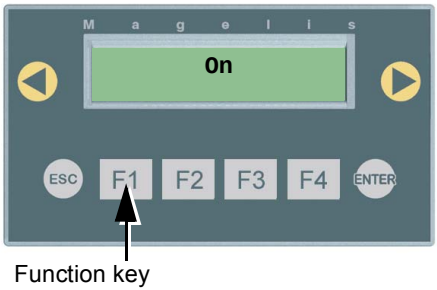


Key	Bit
released	0
pressed	1
released	1
pressed	0

XBT N200	XBT N400	XBT NU400	XBT N401

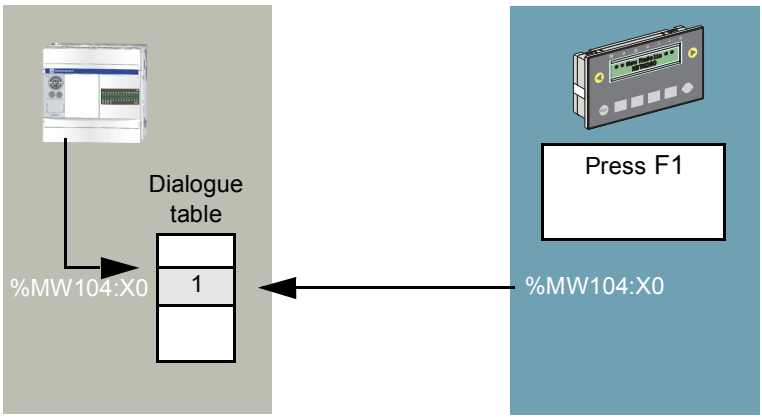
3. Sending commands to the control system

Commands sent via function keys



The dialogue table (see Chapter C, § 4. Dialogue table, page 43) enables dialogue between the PLC and the display unit. In this table, one word is reserved to supply the PLC with the status of the function keys in the form of a word bit.

Bit 15	---	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Reserved			F4	F3	F2	F1



XBT N200	XBT N400	XBT NU400	XBT N401
Display units in "Control" mode only			

The display unit writes to the PLC dialogue table; no program needs to be written in the PLC for managing communication.

NOTE **Pressing both function keys simultaneously triggers both functions.**

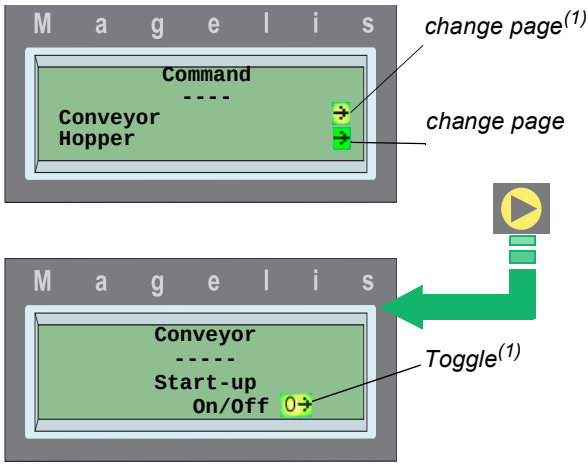
Commands sent via functional links

Functional links are used to create additional control functions. To do this, the operator uses the and keys located on each side of the screen.

The application designer can therefore give the operator the option of sending commands to equipment from the application page.

Commands may be one of two types:
- impulse
- toggle

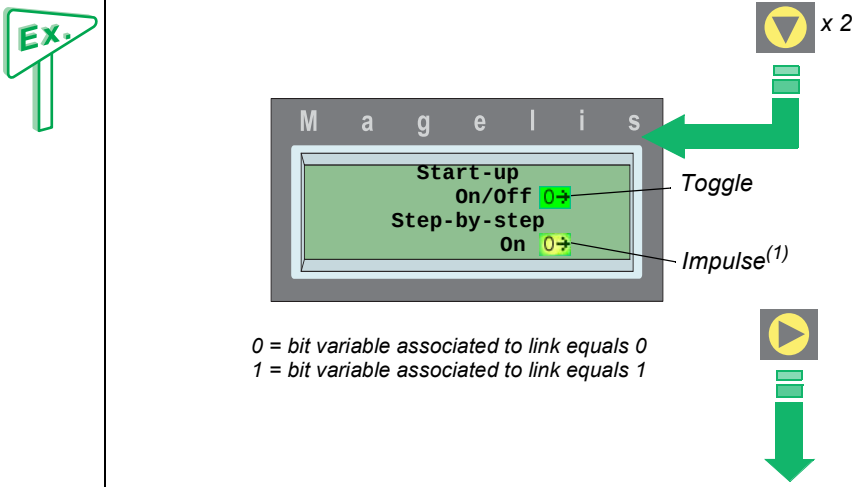
Functional command link



XBT N200	XBT N400	XBT NU400	XBT N401

(1) : link blinking to signal that the link is active

Representation of the functional command links



XBT N200	XBT N400	XBT NU400	XBT N401
No scrolling	For display units in "Input" mode only		

(1) : link blinking to signal that the link is active

These pages are configured and developed by the application designer in XBT L100•.
They are used to display all the information required to control the equipment connected to the terminal.

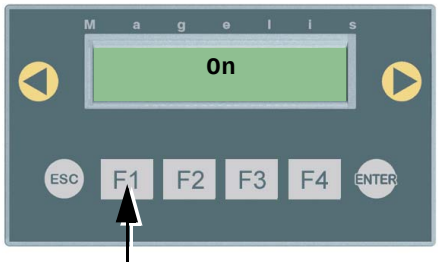
Display of an application page

On power-up (default page)

When designing the application in XBT L100•, the operator can select a default page.
When the display unit is powered up, this is the first page to be displayed.

Via function keys

It is possible to display a page directly by pressing a function key.



Function key

WARNING

IMPROPER OPERATION

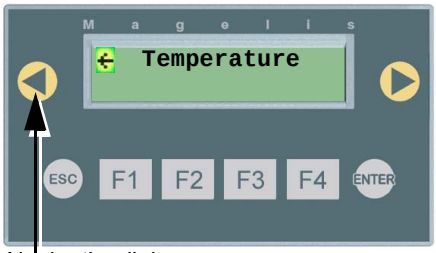
Do not use function key to start an operation which may be dangerous to an inexperimented user.

Failure to follow this instruction can result in death, serious injury or equipment damage.

XBT N200	XBT N400	XBT NU400	XBT N401
For display units in "Control" mode only			

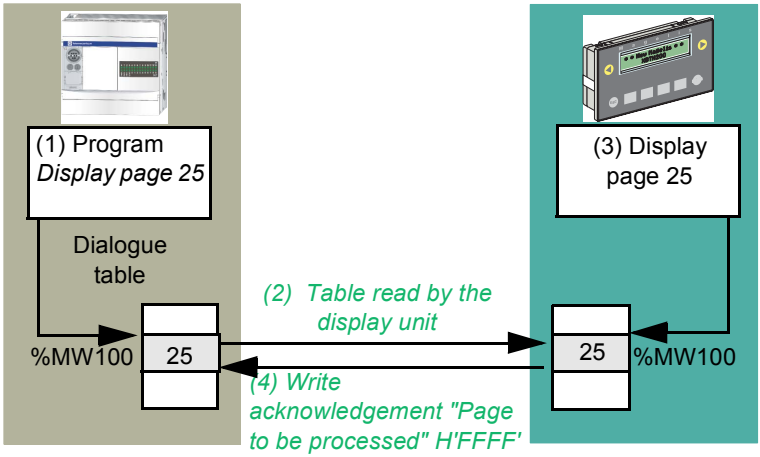
Via a navigation link

As with function keys, it is possible to reach a page directly via navigation links.



Via the PLC

The display is the result of a word in the dialogue table in which the program has written the number of the page to be processed (see Chapter C, § 4. Dialogue table, page 43).

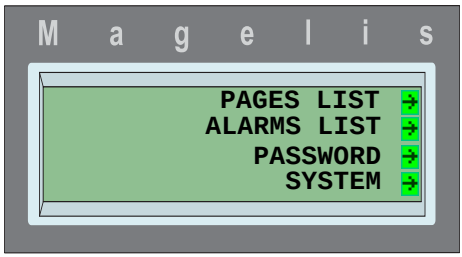


XBT N200	XBT N400	XBT NU400	XBT N401

The PLC dialogue table contains the "Page to be processed" word (1). The display unit reads the dialogue table in the PLC (2) and displays the required page (3); no program needs to be written for managing communication.
Once the command has been processed, the display unit writes the value "H'FFFF'" in the "Page to be processed" word (4), which tells the PLC program that the display request has been acknowledged.

From system pages

System pages are used to display application pages.



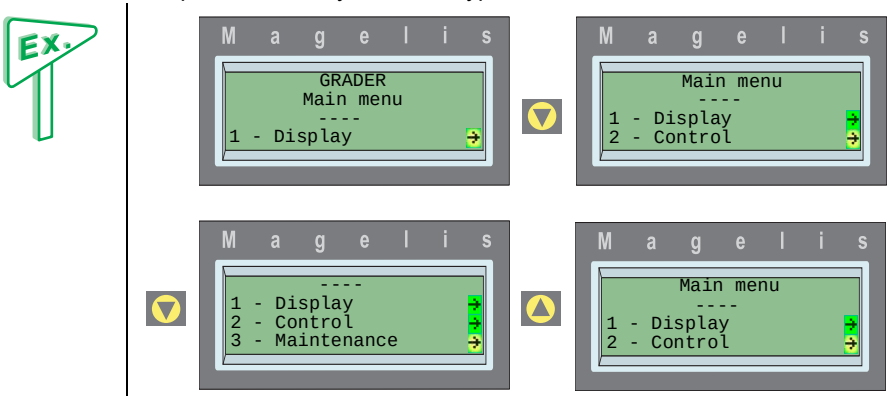
For more information on access to system pages, see § "6. System pages", page 38.

Scrolling within a page

Scrolling is necessary to view the whole of a page which contains more lines than the screen is capable of displaying. On display, the n (n being the number of lines on the display unit) first lines of the page are displayed. For example, four lines for the XBT N400 display unit.

XBT N200	XBT N400	XBT NU400	XBT N401
No scrolling	For display units in "Input" mode only		

The other lines can be displayed by scrolling up or down the page using the up and down keys on the keypad.



XBT N200	XBT N400	XBT NU400	XBT N401
No scrolling	For display units in "Input" mode only		

Entry/modification of a value

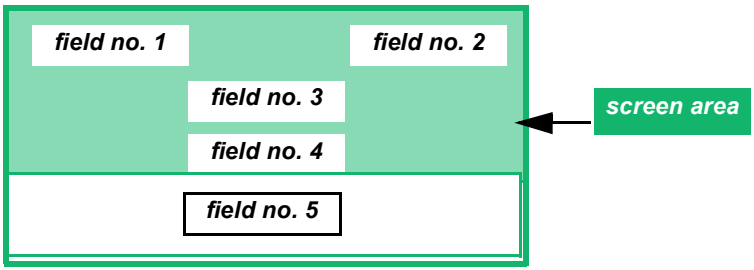
Selection of an entry field

By the operator

The entry field should be visible on screen. Selection is made using the MOD key:

Pressing the MOD key on the display unit keypad several times in succession runs through the variable fields in input mode from left to right and then from top to bottom.

Ex.



1st press on MOD:

If no entry has been made in any field on the screen since the page was displayed, the top left-hand field on the screen is the entry field (field no. 1).
Otherwise it is the last one to have been entered (field no. 1, 2, 3 or 4).

We will assume that field no. 1 is the entry field.

2nd	press on		MOD: entry field no. 2
3rd	press on	MOD	MOD: entry field no. 3
4th	press on		MOD: entry field no. 4
5th	press on		MOD: entry field no. 1, etc.

Field no. 5 cannot be the entry field (it is not visible on screen).

XBT N200	XBT N400	XBT NU400	XBT N401
No scrolling	For display units in "Input" mode only		

By the pilot device

The connected device changes a variable field to input mode by writing its number in a word in the dialogue table. The number of variable fields can be displayed in XBT L100• using the ***Display/Number/Fields*** menu. **First, the application program of the connected device should ensure, again via the dialogue table, that the application page where the field appears is actually being displayed. Otherwise there is a risk of selecting a field on another page.**

In return, the display writes the number of the field being completed in a word in the dialogue table (see Chapter C, § 4. Dialogue table, page 43).

Specific feature of this type of selection:
The operator cannot select another variable field until he has completed the one requested by the connected device (MOD key inactive).

Entering a value (1)

When a field is in input mode, the whole field blinks and two entryways are available: accelerated incremental entry or thumbwheel entry:

- Accelerated incremental entry: By pressing keys and the total value of the field is increased or decreased
- Thumbwheel entry: first by pressing keys and the digit to be modified is selected and it starts blinking. (these keys are managed in the same way as a "drum"; This means that on reaching the end of the variable field you go back to the other end). Then by pressing keys and the digit values are displayed on one direction or the other (these keys are managed also in the same way as a "drum".

XBT N200	XBT N400	XBT NU400	XBT N401
(1) For display units in "Input" mode only			

Confirming an entry

ENTER key

The value entered is transmitted to the connected device. Refreshment of the field which was in input mode is active again.

Cancelling an entry

ESC key

- No write action is performed to the control system
- The value prior to entry is redisplayed
- Refreshment of the field which was in input mode is active again.

Exit entry on time out

If no key is pressed for more than one minute, input mode is abandoned automatically:

- No write action is performed to the control system
- The value prior to input is redisplayed
- Refreshment of the field which was in input mode is active again.

Entry report

At the end of data entry, the pilot device is informed of how the entry ended:

- Confirmation
- Cancellation
- Time out

by updating the "Report" word in the dialogue table (see Chapter C, § 7. Description of the dialogue table words, page 53).

XBT N200	XBT N400	XBT NU400	XBT N401
For display units in "Input" mode only			

Display from an application page

The system pages are accessed by means of function keys or navigation links.
When designing the application in XBT L100•, the operator can choose which system pages he wishes to associate with these keys, or these links.

The system pages which can be accessed by the operator are:
- Date/Time (in read-only mode)
- Menu
  - List of pages
  - Lists of alarms
  - Password
  - System
    - Language
    - Date/Time
    - Reference
    - Protocols

Display from the dialogue table

During the dialogue table read cycle, the display unit may need to display a system page.
For more information on the display of system pages by the dialogue table, see Chapter C, § 7. Description of the dialogue table words, page 53.

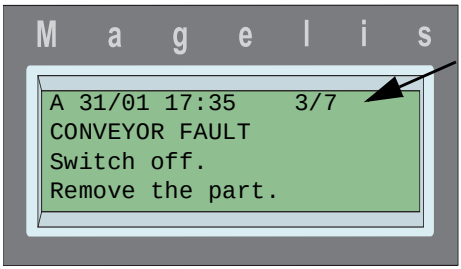
XBT N200	XBT N400	XBT NU400	XBT N401
No access to the "Menu" system page	For display units in "Input" mode only		

Alarm displays

When an alarm is displayed, the first line on the display unit is pre-configured (for XBT L100•) for:

- the dates and times of alarm appearance/disappearance and acknowledgement
- the alarm rank in the alarm list
- the total number of alarms in the list

An alarm is displayed blinking:



Line time-stamped by the XBT ("A" for Alarm), the alarm text appears blinking and changes to a steady display once acknowledgement.

Possibility of ignoring alarms

If an alarm is displayed during operation, the ESC key can be used to return to run mode, the alarm is still in the list, and the ALARM indicator light changes to a steady display.

Viewing alarms

Exit viewing alarm pages.

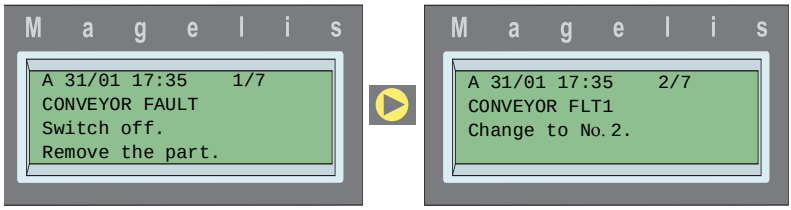
Scroll through the alarm page (up to 25 lines).

Scroll through the list of alarm pages.

The alarm is acknowledged on the display by pressing ENTER. The alarm message changes to a steady display.

XBT N200	XBT N400	XBT NU400	XBT N401
No indicator lights No alarm management	No indicator lights		

7. Alarm pages

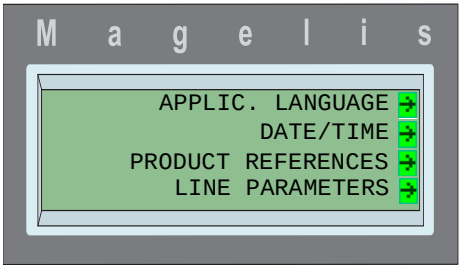


The left and right arrow buttons are used to scroll through the alarm list.

XBT N200	XBT N400	XBT NU400	XBT N401
No alarm management			

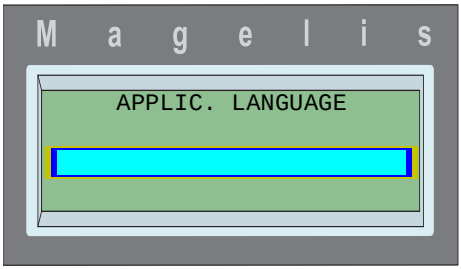
It is possible to configure certain display unit parameters when it is in run mode, without going into XBT L100•.

The configuration parameters are accessed by the "SYSTEM" system page (Displaying system pages, see § 6. System pages, page 38).



Application language

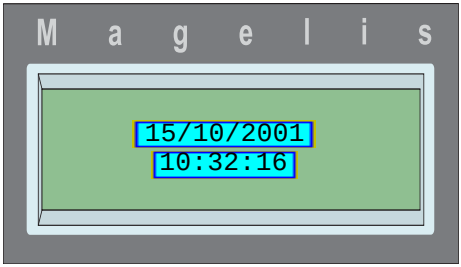
One of the languages configured by the designer can be chosen.



XBT N200	XBT N400	XBT NU400	XBT N401
No access to the "SYSTEM" system page	For display units in "Input" mode only		

Date and time

This page is used to set the current date and time. It is also possible to set the date and time display format.



Entering the date and time

The date and time are entered in the same way as a variable alphanumeric field (see § Entering a value (1), page 36).

Selecting the display format

The display formats are as follows:

Ex.

Date formats	Time formats
DD/MM/YYYY	24:mm:ss
MM/DD /YYYY	12:mm:ss
YYYY/MM/DD	

The format can be configured using the XBT L100• program, during terminal configuration (see Chapter C, § Step 2 - Configuring the terminal parameters, page 13).

XBT N200	XBT N400	XBT NU400	XBT N401
In read-only mode	For display units in "Input" mode only		

8. Setting the display unit parameters

Product references

The display unit references can be accessed from the system pages.

If the designer has provided access to these pages (link to the system pages), it is possible to find out the display unit references. The information displayed is as follows:

- The product reference
- The name of the application developed in XBT L100•
- The date and time that the application file was saved in XBT L100•
- The communication protocol name
- The version of XBT L100• used to create the application
- The display unit BIOS reference and version
- The terminal application software reference and version

NOTE: **The most important information is placed on the first few lines so that it is displayed consecutively, avoiding the need to scroll through the page.**

XBT N200	XBT N400	XBT NU400	XBT N401
No access to the "SYSTEM" system page	For display units in "Input" mode only		

8. Setting the display unit parameters

Line parameters

This system page is used to display information relating to the communication protocol, such as the speed or parity.
Error counters also appear on this page, and their meaning is as follows:

Counter	*Modbus*	*Unitelway*
1	Number of responses received without a CRC error by the master	Number of messages sent and not acknowledged
2	Number of messages received with a CRC error by the master	Number of messages sent and refused
3	Number of exception responses received by the master	Number of messages received and not acknowledged
4	Number of spreading authorization requests sent by the master	Number of messages sent and refused
5	Number of requests still awaiting a response	Number of messages sent correctly
6	Number of 'PLC not ready' responses received by the master	Number of messages received correctly
7	Number of incorrect characters received	Number of emitting frames sent
8	Number of requests correctly executed	Number of receiving frames received

XBT N200	XBT N400	XBT NU400	XBT N401
No access to the "SYSTEM" system page			

Chapter C
Detailed description of the XBT L100• program

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Contents

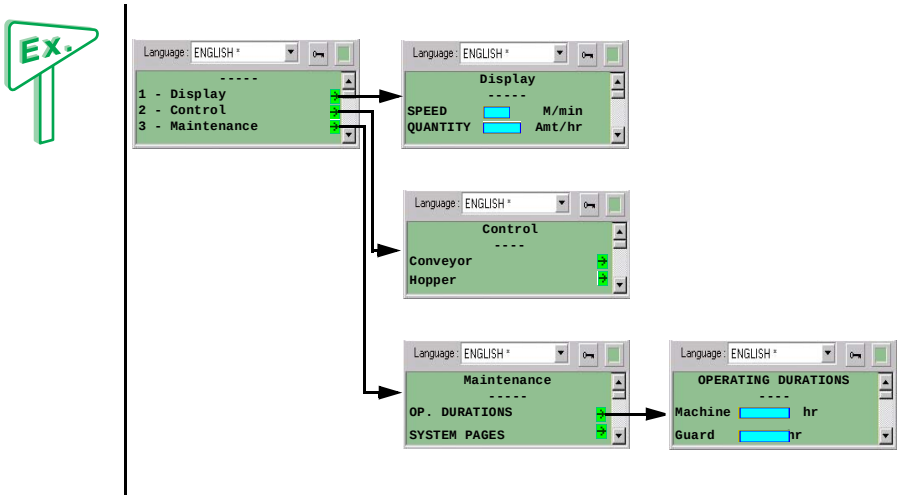
1. Introduction: Creating Magelis applications

A Magelis application consists of all the dialogue between the operator and the automated process. In its entirety, this should take account of:

- the criteria relating to the control system:
  - production monitoring
  - preventive maintenance
  - corrective maintenance
  - process control
- the user criteria:
  - user interface
  - level of intervention
- the criteria for creating the actual dialogue application:
  - programming
  - debugging
  - upgrading.

NOTE: **These constraints mean that it is necessary to structure your application. An application should consist of a set of pages, which can be arranged in a tree structure as shown in the figure below:**

C



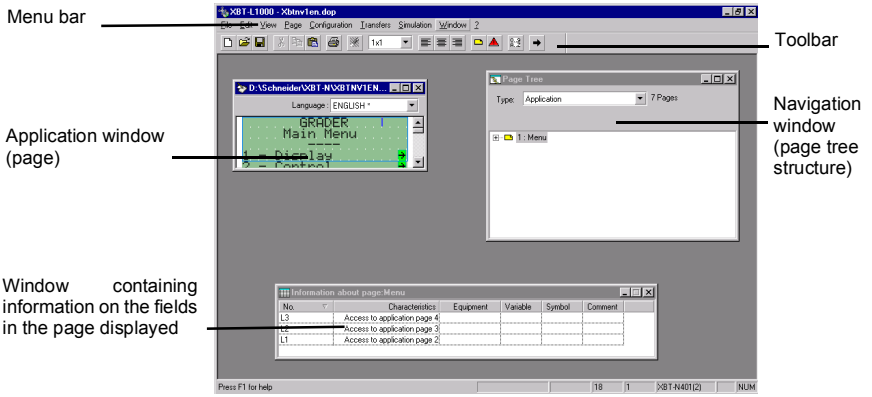
XBT N200	XBT N400	XBT NU400	XBT N401

Launching the program in Windows

The software can be launched:
- by selecting the XBT L100• program from the program menu
- by double-clicking on the XBT L100• icon from the desktop:

- by double-clicking on the icon of a dialogue application (*.dop)

By default, the software opens the latest application saved during the previous session.
The ***File/Open the latest application automatically*** menu can be used to modify this option. The creation window then opens.


Menu bar
Toolbar
Application window (page)
Navigation window (page tree structure)
Window containing information on the fields in the page displayed

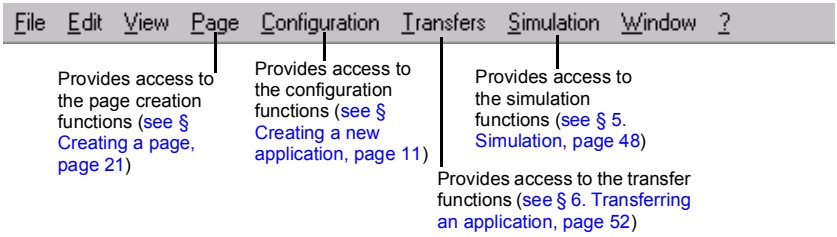
Presentation of the software

Menu bar

If no application has been opened, the following menu bar is displayed:

XBT N200	XBT N400	XBT NU400	XBT N401

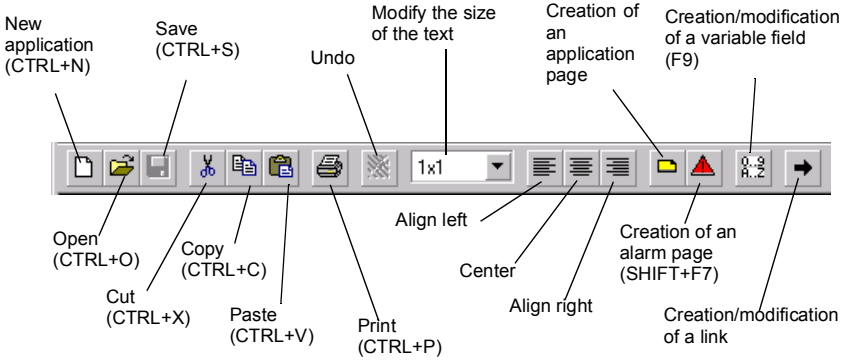
If an application has been opened, the menu bar is as follows:


File Edit View Page Configuration Transfers Simulation Window ?
Provides access to the page creation functions (see § Creating a page, page 21)
Provides access to the configuration functions (see § Creating a new application, page 11)
Provides access to the simulation functions (see § 5. Simulation, page 48)
Provides access to the transfer functions (see § 6. Transferring an application, page 52)

Toolbar

If no application has been opened, the primary window toolbar contains the following buttons:

During editing of an application page or an alarm page the primary window toolbar contains the following buttons:

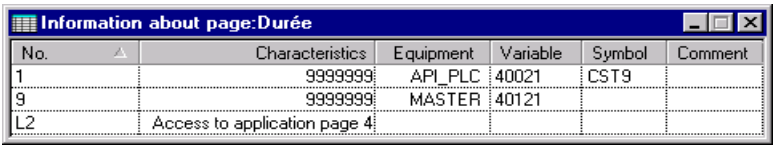


NOTE: **Depending on the type of display unit selected, certain icons on the toolbar are inactive (grayed-out).**

XBT N200	XBT N400	XBT NU400	XBT N401

Field information window

The field information window is used to display the properties of fields and links to the current application page.

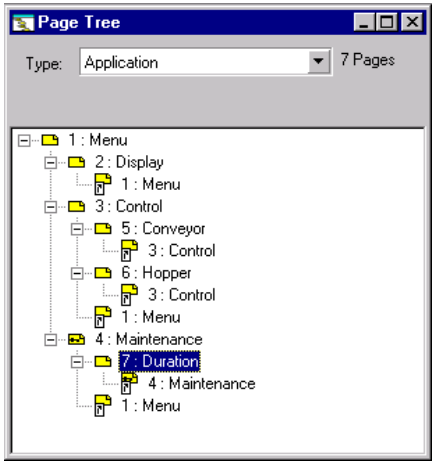


No.	Characteristics	Equipment	Variable	Symbol	Comment
1	9999999	API_PLC	40021	CST9	
9	9999999	MASTER	40121		
L2	Access to application page 4				

The "***No.***" column indicates the number of the field or link.
The "***Characteristics***" column indicates the field type and length. In the example above, we can see that field no. 1 is decimal type and seven characters long.
The "***Symbol***" column indicates the equipment symbol to which the variable is linked (see § Configure equipment window, page 16).
The "***Comment***" column indicates the comment linked to the symbol.

Navigation window

The navigation window contains the page structure of the active application and specifies the current page.



XBT N200	XBT N400	XBT NU400	XBT N401

By clicking on the ***Type*** dropdown list, the operator can choose to display the application, alarm or system page tree structure.

The different types of page are represented in the window by the following symbols:

Symbol	*Type of page*
	Application page
	Protected application page
	Application page alias (1)
	Protected application page alias (1)
	Alarm page
	System page
	Protected system page
	System page alias (1)
	Protected system page alias (1)

XBT N200	XBT N400	XBT NU400	XBT N401
No alarm management			

((1): Alias see § Alias, page 26)

In general

Using copy/paste

The copy/paste function can be used on any object (text, fields, links, etc), within the same application, or from one application to another, if the equipment symbols are identical. To paste an object in place of a field or a link, the latter must be selected.
A navigation link can only be pasted if the page to which it is linked exists.

Alignment

Text within a page can be aligned:
- left
- center
- right

To do this, simply go to the line where alignment is required, then click on one of the toolbar buttons.

XBT N200	XBT N400	XBT NU400	XBT N401

Creating a new application

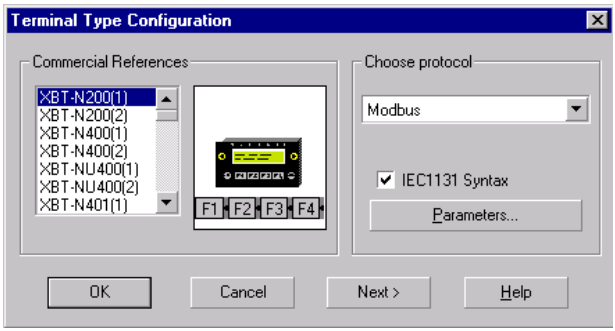
To create an application in XBT L100•, click on the button on the toolbar or select ***New*** in the ***File*** menu.
Applications can be created with or without an assistant.

Creation without an assistant

Creating an application without an assistant involves the following stages:
- Step 1: Choice of type of terminal
- Step 2: Configuring the terminal parameters
- Step 3: Configuring the protocol parameters
- Step 4: Configuring the equipment
- Step 5: Choice of application languages
- Step 6: Configuring the dialogue table

Step 1 - Choice of type of terminal

An initial window is used to select the display unit and the protocol associated with the application to be created.
The terminal selection window is as follows:



It is also possible to select a display unit in input mode, or a display unit in control mode. Depending on which is selected, the display unit keypad is different.

XBT N200	XBT N400	XBT NU400	XBT N401

"Input" version display unit
Example: XBT N200(2)

"Control" version display unit
Example: XBT N200(1)

NOTE: **The change of version should be accompanied by a change of the key legends (see quick reference guide).**

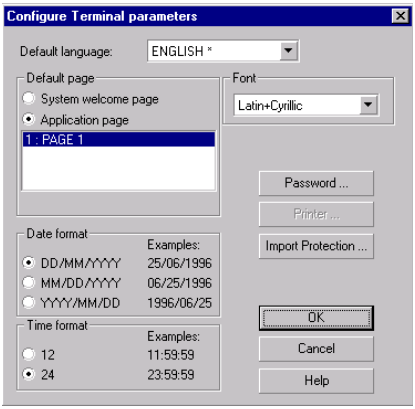
This distinction is apparent in the list of product references, by the notation (1) or (2). For example, the reference ***XBT N200(1)*** indicates a "Control" version XBT N200 display unit, whereas the reference ***XBT N200(2)*** indicates an "Input" version XBT N200 display unit.

- By confirming with the "OK" button, a new application can be created without using the creation assistant.
- "Clicking" on the "Next >" button guides the designer in creating a new application by linking several windows (see § "Creation with an assistant", page 19).
- "Clicking" on the "Parameter..." button enables access to configuration of the selected protocol parameters (see § "Step 3 - Configuring the protocol parameters", page 15).
- The check box marked "IEC1131 Syntax" is used for ModBus protocol to choose the syntax used for the variable addresses.

XBT N200	XBT N400	XBT NU400	XBT N401

Step 2 - Configuring the terminal parameters

This window appears after selection of ***Terminal Parameters*** from the ***Configuration*** menu.



This window is used to configure the following terminal parameters:

- the default language (this language will be used when the terminal is powered up)
- the application font (Latin+Cyrillic or Latin+Katakana)
- the default page (the choice is made in a list corresponding to the list of existing application pages)
- protection of application importing
- passwords
- the date format used by the display unit
- the time format used by the display unit

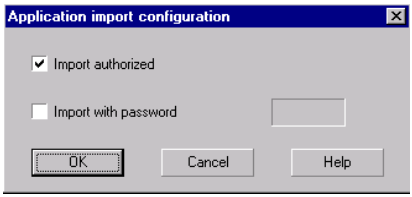
XBT N200	XBT N400	XBT NU400	XBT N401
Only Latin+Katakana			

Application import configuration

This function is used to protect the display unit dialogue application to avoid unwanted "hacking".

It is possible to choose:

- whether the application can be imported (by default) or not
- whether a password is required for importing or not

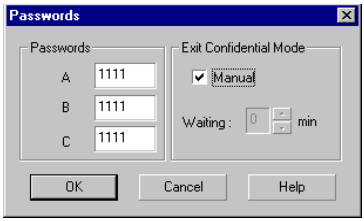


During data entry, the password is displayed without encryption. It consists of four ASCII characters ([0..9]+[A..Z]).

If importing has not been authorized and an operator tries to import the application, an error message appears at the start of importing and the transfer is not completed.
If importing has been authorized with a password, the password entry screen appears. If the password entered is incorrect, an error message appears and the application is not transferred.

In all cases, exporting remains possible.

Password configuration



Three passwords, A, B and C can be configured. Each password consists of four ASCII characters ([0..9]+[A..Z]).
These three passwords are configured by default as "1111".

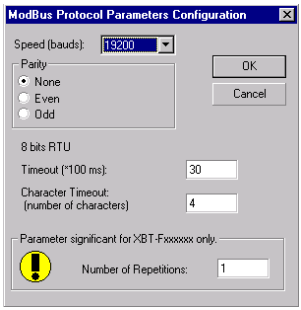
XBT N200	XBT N400	XBT NU400	XBT N401

Step 3 - Configuring the protocol parameters

This window appears after selection of ***Protocol Parameters*** from the ***Configuration*** menu.

This window is used to:

- indicate the protocol line parameters
- enter parameters specific to the protocol



The appearance of the dialogue box depends on the chosen protocol.

C

Step 4 - Configuring the equipment

This window appears after selection of ***Equipment Symbols*** from the ***Configuration*** menu.

Principle

A control system consists of several devices which may be linked to one or more display units. A device may be a PLC, a computer, a variable speed drive, etc. The display unit itself is deemed to be a device, enabling it to have its own variables, such as date, time, etc.

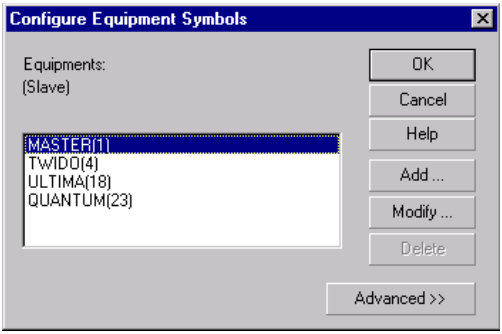
From the viewpoint of XBT L100•, a device is defined by two characteristics: the equipment address and symbol. The address depends solely on the protocol used.

One display unit can communicate with a maximum of fifteen different devices.

XBT N200	XBT N400	XBT NU400	XBT N401
Mono-equipment			

Configure equipment window

By selecting ***Equipment Symbols*** from the ***Configuration*** menu, it is possible to create, modify or delete equipment symbols.

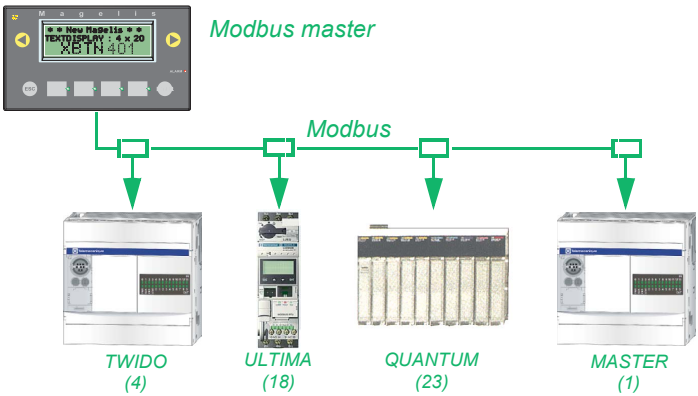


By default, the list contains one device with a default address, whose symbol is "MASTER". This equipment cannot be deleted, but its name and its address can be modified.

A symbol is associated with one address only, and vice versa.

The equipment creation/modification window differs according to the chosen protocol.

Ex.

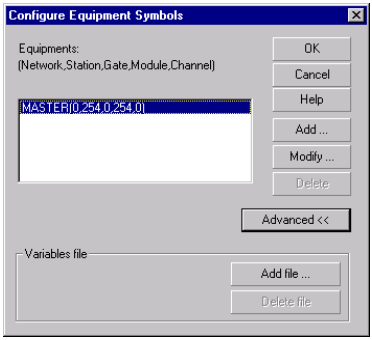


XBT N200	XBT N400	XBT NU400	XBT N401
Mono-equipment			

Importing PLC symbols

It is possible to associate variables files with equipment which appears in the list. These files should have been generated from either PL7 or Concept PLC programming software.

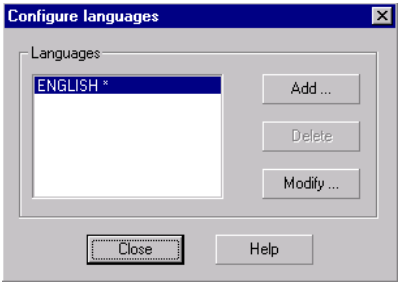
The "Advanced >>" button brings up a zone at the bottom of the configuration window where this association can be made.



The "Add file" button enables the designer to select the variables symbol file. The extensions for these files are ".SCY" (PL7) or ".TXT" (Concept).

Step 5 - Choice of application languages

By selecting ***Application Languages*** from the ***Configuration menu,*** it is possible to modify the list of languages used by the application.



XBT N200	XBT N400	XBT NU400	XBT N401

The "Delete" button deletes the selected language. The reference language cannot be deleted.

If several application languages are used, a copy of the pages is generated for each language in the list.
Any modification of variable fields or links in a page in the reference language (first in the list) is systematically carried through to the other language pages. However, any modification of static text has no effect on the static text on other application language pages. The same applies to text in enumerated lists.

All that can be entered in other language pages is static text and text in enumerated lists. Modification of text in any other language than the reference language has no effect on other language pages. It is not possible to delete, modify, move or add a variable field or a link from a page edited in any other language than the reference language.

A dropdown list in the application primary window toolbar indicates the name of the current application language. If only one application language has been configured, this list is inactive. When the selected language is the reference language, an asterisk ("*") appears after the language name.
The reference language is the application development language.
A default language can be defined on opening the application (see § Step 2 - Configuring the terminal parameters, page 13).

Step 6 - Configuring the dialogue table

By selecting ***Dialogue Table*** from the ***Configuration*** menu, it is possible to configure the dialogue table and any additional alarm tables which enable alarms to be triggered by several devices.

(For more information on configuring the dialogue table, see § 4. Dialogue table, page 43)

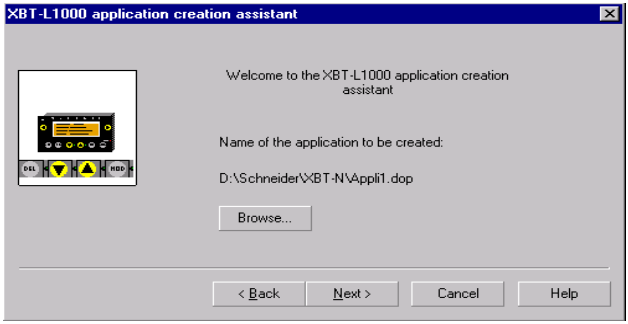
XBT N200	XBT N400	XBT NU400	XBT N401
Mono-equipment			

Creation with an assistant

The application creation assistant is accessed by clicking on the "Next >" button in the terminal selection window (see § "Step 1 - Choice of type of terminal", page 11).

Step 1 - Entering the application name

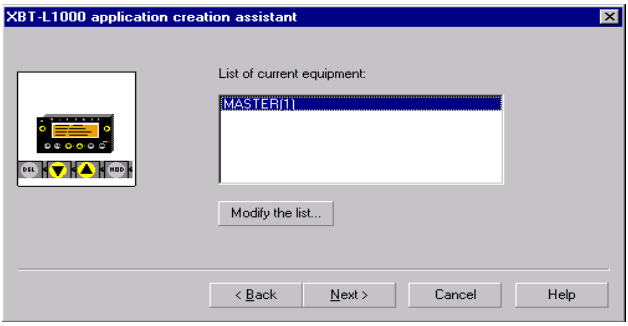
This window is used to indicate the name and location of the application file you wish to create ("Browse..." button).



The "Next >" button is used to go to the next step in the assistant.
The "Cancel" button closes the application creation assistant.

Step 2 - Configuring the equipment

This dialogue box is used to specify the equipment relating to the application.



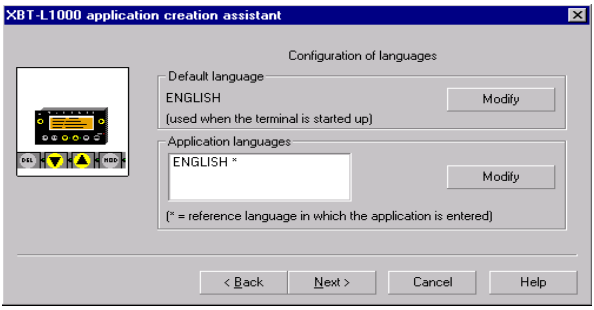
XBT N200	XBT N400	XBT NU400	XBT N401

The "Modify list" button brings up another window where equipment can be added, modified or deleted. For more information, see § "Step 4 - Configuring the equipment", page 15.

The "< Back" button is used to go to the previous step in the assistant.
The "Next >" button is used to go to the next step in the assistant.
The "Cancel" button closes the application creation assistant.

Step 3 - Configuring the application languages

This window is used to specify which languages can be used by the application (in the case of multilingual applications).



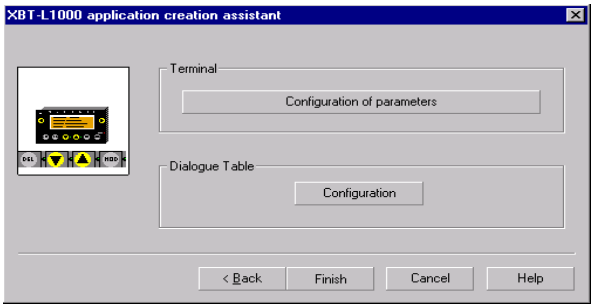
This window is divided into two parts:

- The "Default language" part consisting of:
  - a display area containing the default language
  - a "Modify" button which opens the "Configure Terminal Parameters" window, used to modify the default language on opening
- The "Application languages" part consisting of:
  - the list of application languages, with the reference language followed by the "*" symbol. For example: English*
  - a "Modify" button which opens the "Choice of application languages " dialogue box

The reference language is the application development language.

XBT N200	XBT N400	XBT NU400	XBT N401

Step 4 - Configuring the display unit and dialogue table parameters



The "Parameter configuration" button is used to open a new dialogue box for configuring the display unit parameters (see § Step 2 - Configuring the terminal parameters, page 13).

The "Configuration" button is used to open the dialogue table configuration window. (see § "Step 6 - Configuring the dialogue table", page 18)

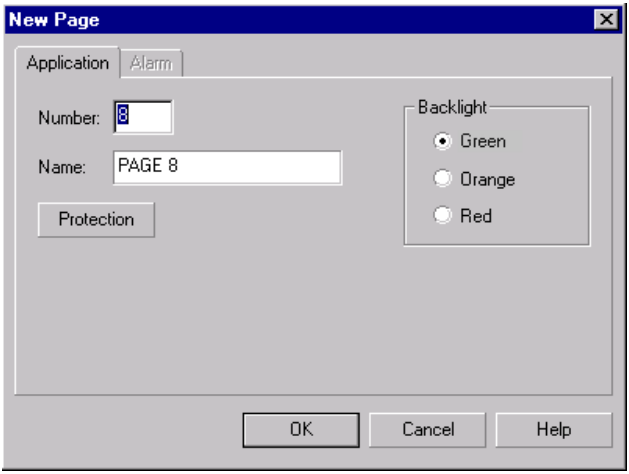
The "Finish" button exits assistant mode and closes application creation.

Application pages

Creating a page

An application page is created in a number of ways:
- clicking on the toolbar button
- pressing F7 on the keyboard
- selecting ***Application*** from the ***Page/New Page*** menu

XBT N200	XBT N400	XBT NU400	XBT N401



The page number offered by default is incremented by 1 in relation to the latest page created for the current application.
The page name is limited to twelve characters.

The "Protection" button is used to configure access to the page (see § "Protecting a page", page 23).

It is possible to choose the backlight color for the page: green, orange or red from this window.

Page properties

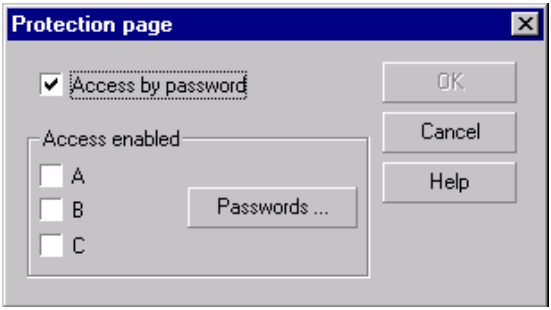
The properties of an application page can be accessed:
- from the menu bar, ***Page/Properties***
- from the page tree structure window, by right-clicking on the chosen page

The window is identical to that used for creation.

XBT N200	XBT N400	XBT NU400	XBT N401
No backlight color			

Protecting a page

The "Protection" button in the creation/properties window of an application page is used to access the window below.



- Check the first box to protect the page.
- Check the passwords (A, B, C) which will be authorized to access this application page.

Clicking on the "Passwords" button accesses the window for changing passwords.

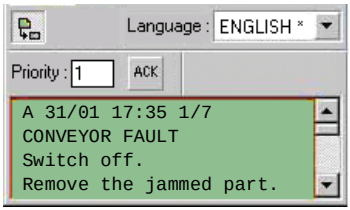
NOTE: **When creating an application page, the protection values offered by default are those chosen for protection of a previous page.**

By default, an application page is not protected.

If the page is protected, the protected application page icon appears in the tree structure window (see § Navigation window, page 8).

XBT N200	XBT N400	XBT NU400	XBT N401

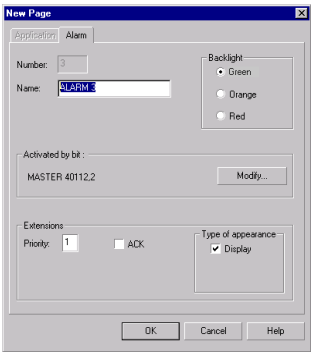
Alarm pages



Creation

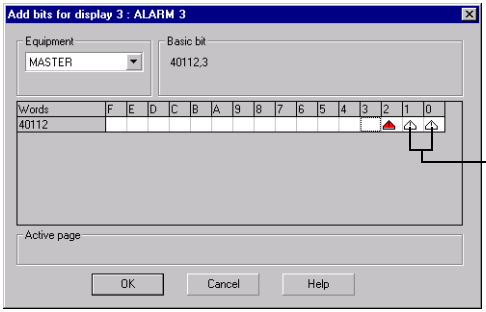
Creation of an alarm page is only possible if the "Alarm table" function has been selected in the dialogue table.
This can be done in a number of ways:

- clicking on the toolbar button
- pressing SHIFT+F7 on the keyboard
- selecting ***New Page/Alarm*** from the ***Page*** menu



XBT N200	XBT N400	XBT NU400	XBT N401
No alarm management			

Next, indicate which bit will activate the alarm page. To do this, simply click on the "Modify..." button.



Then simply select the activation bit.

Page properties

The properties of an alarm page can be accessed by selecting ***Page/ Properties*** from the ***Page*** menu.
The dialogue box is identical to that used for creation.

Alarm acknowledgements

It is possible to define whether the alarm must be acknowledged:
- Acknowledgement not required: The alarm disappears from the list of alarms once the problem detected has been resolved
- Acknowledgement required: The alarm only disappears from the list of alarms if the problem detected has been resolved and the alarm has actually been acknowledged.

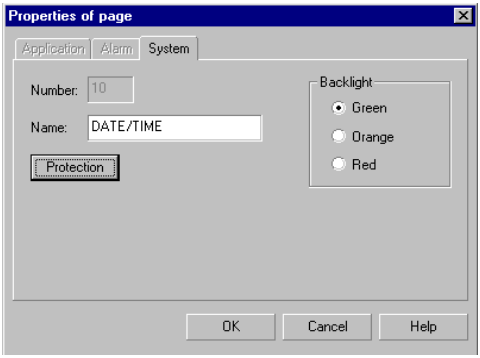
To use the required acknowledgement option, first select an alarm page and click on the ACK ACK button.

XBT N200	XBT N400	XBT NU400	XBT N401
No alarm management			

System pages

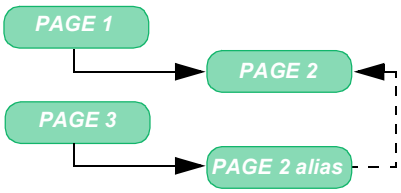
Page properties

The properties of a system page can be accessed in the same way as for application pages.
Only the name and protection of system pages can be modified.



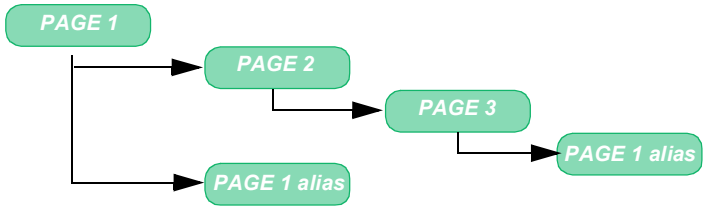
Alias

The tree structure representation of application and system pages uses aliases for navigation between pages.
It is quite possible to use the same application page in several tree structures.



XBT N200	XBT N400	XBT NU400	XBT N401

An alias is represented as a page. A page can call up any other page, itself included, as shown in the following example:



An alias always has the same name and number as the original page.

NOTE: **It is impossible to link alarm pages, and alarm page alias do not therefore exist.**

Navigation links

Navigation links are objects displayed on the screen which can be used to navigate between the various application pages, using the

and keys on the display unit keypad (see § Functional links, page 40).

Text

Text can be entered in n different languages (n being limited by the size of the display unit memory), and the display unit displays the text corresponding to the selected language.

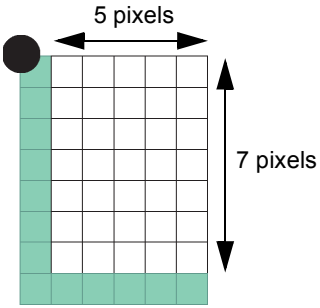
Properties

A single-size character is encoded on a rectangle 6 pixels wide and 8 pixels high (5 pixels wide by 7 pixels high for XBT N200s). Its sizing handle is located on the top left-hand corner of this rectangle.

XBT N200	XBT N400	XBT NU400	XBT N401
One character size: 5 x 7 pixels	Seven character sizes: 6 x 8 to 24 x 32 pixels		

For the default font, ASCII characters are encoded in a single-size character (6 x 8) with separation of one pixel at the left and the bottom (ie. a rectangle of 5 x 7 pixels).

Size of a single-size character : Default font: 5 x 7 pixels



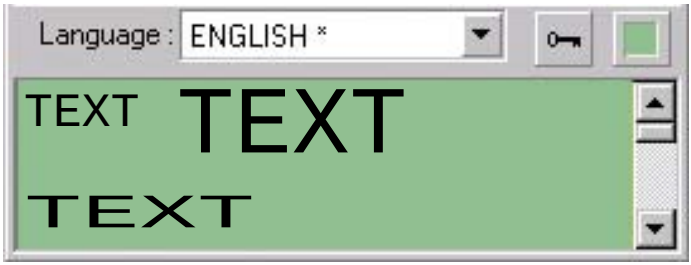
Characters can be represented in seven different sizes extrapolated from the single-size font (double width, double height, double size, etc). Maximum number of characters on the screen according to the size:

Size of characters L x H compared to single size	*Single size 1 X 1*	*Double H 1 X 2*	*Double L 2 X 1*	*Double size 2 X 2*	*Double L Quadruple H 2 X 4*	*Quadruple L Double H 4 X 2*	*Quadruple size 4 X 4*
XBT N200	2X20	-	-	-	-	-	-
XBT N40• XBT NU400	4X20	2X20	4X10	2X10	1X10	2X5	1X5

Characters are positioned on a grid defined by the number of characters and the number of lines the display unit can support.
A character has its own set of a parameters. This makes it possible to have characters with different properties on the same line.

XBT N200	XBT N400	XBT NU400	XBT N401
One character size: 5 x 7 pixels	Seven character sizes: 6 x 8 to 24 x 32 pixels		

Example for a display unit with 4 lines X 20 characters:

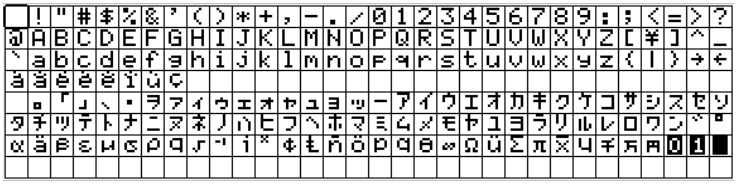


Character fonts

The character fonts available are "Latin+Cyrillic" or "Latin+Katakana".

"Latin and Cyrillic" font

"Latin and Katakana" font

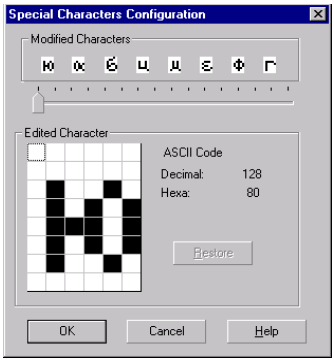


The choice of character font is made in the terminal parameters (see § "Step 2 - Configuring the terminal parameters", page 13).

XBT N200	XBT N400	XBT NU400	XBT N401
Only Latin+Katakana			

Modifiable characters

For all fonts used by XBT N display units, the first 96 characters can not be edited.
Modification of special characters can be accessed by selecting ***Special characters*** from the ***Configuration*** menu.



Inserting special characters

To insert a character which does not exist on the keyboard (special character or a non keyboard character) when entering text or values from an enumerated list.
The copy/paste function is used to insert special characters.

By selecting ***Insert Characters*** in the ***Edit*** menu, the following character table appears:

XBT N200	XBT N400	XBT NU400	XBT N401
Only Latin+Katakana 5 modifiable characters	125 modifiable characters		

Choose the desired character and press the ***Copy*** button. Then simply paste the selection.

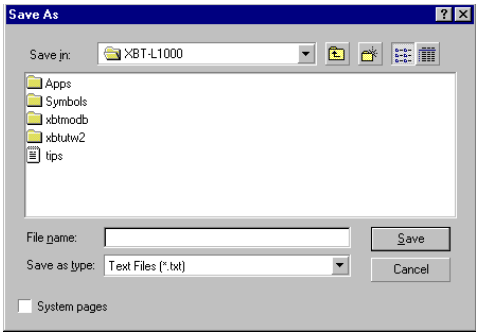
This function is also useful for displaying all the characters in the font selected for the application.

Importing/exporting text for translation

This function is used to translate a dialogue application into several languages.
Recommended methods:

1 - Enter the monolingual dialogue application in the l'XBT L100o.
2 - Add the languages wished ("Application languages configuration"). The original texts are copied and generated in each language.
3 - Export the texts ("File\export texts") to a new file.

.



4 - Check the box " System Pages ". This also enables to translate the system messages of the display unit.

The exported (or imported) information is as follows:
- page names
- application page text (application, alarm, system pages)
- text in enumerated list-type alphanumeric fields

XBT N200	XBT N400	XBT NU400	XBT N401

When exporting text, the information is recorded as follows: one column per language (separator: tab) and one line per text. There are as many columns as languages.

French	English	German
Bonjour	Hello	Hallo
un 2	one 2	eins 2
au revoir	goodbye	auf wiedersehen

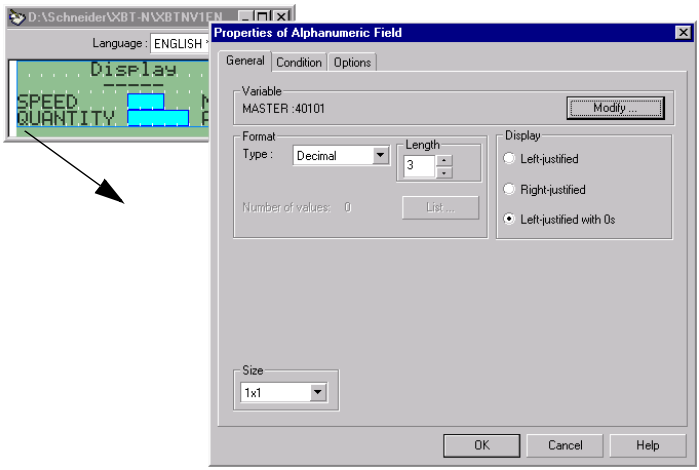
The first column contains the texts in the reference language. They must not be modified.

5 - Translate the texts (columns 2 and next) using the Windows application you selected (Ex. : Microsoft Excel). Save the file and quit the Windows application.

6 - Import the translations ("File\Import translations").

Alphanumeric variable fields

These fields are used to display the value of a variable in the display unit or the connected equipment.



XBT N200	XBT N400	XBT NU400	XBT N401

Field properties

Display format

- Binary
- Decimal
- Hexadecimal
- ASCII
- Enumerated list

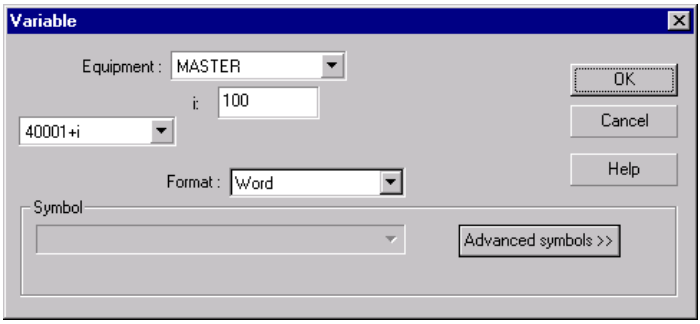
Size:

The content of the fields is displayed with the same character fonts as static text. The size options are therefore the same.

Length:

1 to n digits, n depending on the display format and the type of data displayed.

The "Modify" button brings up the window where certain variable information can be modified.



NOTE: **If the number of digits in the whole value to be displayed is more than the number of digits that can be displayed, the alphanumeric variable field displays an error message.**

XBT N200	XBT N400	XBT NU400	XBT N401

Variables of associated connected equipment:

	Word Bit	Word	Double word	Floating	String
Binary	X	X			
Decimal		X	X	X	
Hexadecimal		X	X		
Enumerated list	X	X	X		X
ASCII					X

Operator access to fields:

The following access options are available:

- Read: Display only.
- Write: Possibility of entering the variable value, without possibility of reading it. This instance is reserved for certain variables which cannot be read.
- Immediate write: Incremental entry and adjustment of the variable value. Adjustment enables the field value to be gradually increased or decreased without the need to confirm using ENTER.
- Read/write: Display and possibility of modification of the field value.
- Immediate read/write: Display and possibility of incremental entry and adjustment of the variable value. Adjustment enables the field value to be gradually increased or decreased without the need to confirm using ENTER.

Protection:

Access to a field can be password-protected. The value represented by the field cannot be modified by the user unless the corresponding password has been entered.

NOTE: **If there is no password configured for the field (neither A, neither B, neither C), it will be possible to enter it only through the dialogue table (Word "field number to be entered").**

XBT N200	XBT N400	XBT NU400	XBT N401

Limits:

Min/Max limits associated with the variable objects are used to:

- Signal to the operator that the variable value entered by the connected equipment is not within the defined range [Min, Max].
- Ensure that the value entered by the operator is within a given range.

These limits can be accessed via the "Options" tab.

Constant limits:
The values of constant limits are entered when the application is designed in XBT L100•. These values cannot be modified in run mode.

Variable limits:
These are associated with variables for the connected equipment, and can therefore be modified by this equipment in run mode.
The variables associated with the limits are the same type as the variable associated with the variable object (words, floating points, etc).

NOTE: **These variables are read only when the request is made to display the page containing the variable object concerned.**

Conversion

The value of the connected equipment variable can be modified using the following formula:

Y = (A * X) + B where

- A and B: Constants (floating points) entered during configuration with XBT L100•.
- X: Variable read in the control system.
- Y: Whatever is displayed by the variable object.

This conversion is configured via the "Options" tab.

XBT N200	XBT N400	XBT NU400	XBT N401

Display:
Used to specify how the digits representing the value will be placed in the space reserved for the alphanumeric field.

- For a decimal type field, the following alignment options are offered:
  - left
  - right (default)
  - right with display of non-significant zeros

Left alignment:	123
Right alignment:	123
Non-significant zeros (completed with leading zeros):	000123

- For other formats, alignment is automatic:
  - Binary: aligned right with the addition of leading zeros
  - Hexadecimal: aligned right with the addition of leading zeros
  - Enumerated list: aligned left with the addition of "Space" characters to the right
  - ASCII: aligned left with the addition of "Space" characters to the right

Enumerated lists

An enumerated list is a list of pairs of values/text. The advantage of this type of list is that text can be displayed in a variable field according to the value of a PLC variable.

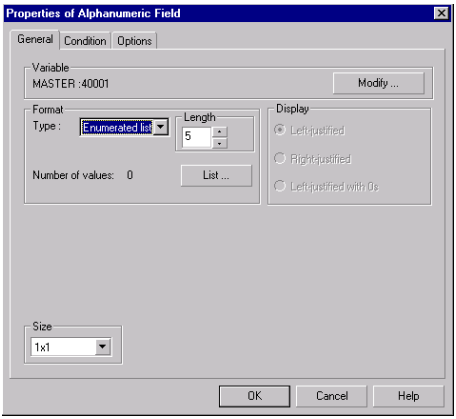
	Maximum value
Number of texts per list	64
Characters per text item	20

In cases where the selected PLC object equals "BIT", there are only two possible values: 0 and 1.

XBT N200	XBT N400	XBT NU400	XBT N401

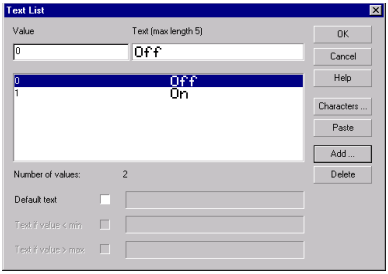
Selecting "Enumerated list" as the display type makes the "List..." button active.

The "General" tab then appears as shown below:



The "Number of values" field is also active and gives the number of values entered in the list.

The "List..." button is used to open a dialogue box which can be used to create, modify and delete value/text pairs in the enumerated list associated with the variable field.

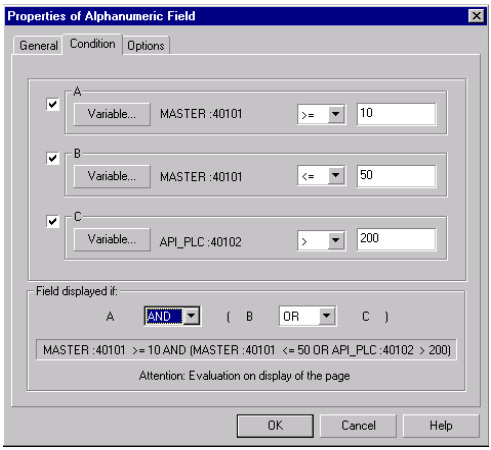


NOTE: **A "Characters" button is used to open the tool for selecting special characters. The font displayed is the application font.**

XBT N200	XBT N400	XBT NU400	XBT N401

Condition

The "Condition" tab is used to enter a calculation formula conditioning display of the value.



The condition can include a maximum of 3 comparisons linked by logical operators:
OR, AND and XOR.
The possible comparisons are: =, <>, >, >=, <, <=

A comparison has a variable on the left and a constant on the right.
Check boxes in front of each comparison are used to create a condition with 1, 2 or 3 comparisons.

The "Variable" button is used to modify the variable address.

The condition does not take non-activated conditions into account (check box empty).

A reminder of the combination then appears (in the "Field displayed if" part) in plain text.

XBT N200	XBT N400	XBT NU400	XBT N401

The variable field is displayed if the condition is TRUE, otherwise it is not displayed.

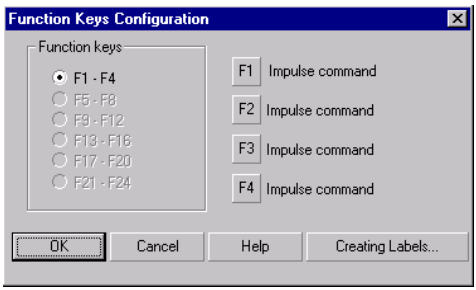
NOTE: **The conditions are only assessed when the page containing the variable field is displayed.**

Configuring the function keys

This operation is performed by selecting ***Function Keys*** from the ***Configuration*** menu.

Function keys are configured in blocks of 4.
Blocks of keys which cannot be configured for the terminal are inactive.

A function key can be one of 2 types:
- "Page access" type: access to an application or system page
- "Command" type



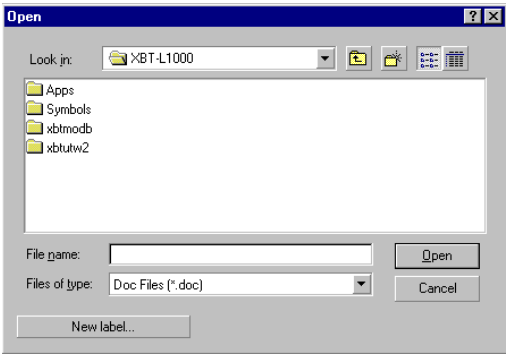
For a command type key, the designer can choose the type of key action:
- Toggle
- Impulse

By default, each function key is configured as an impulse command key.

XBT N200	XBT N400	XBT NU400	XBT N401
For display units in "Control" mode only			

Creating labels

A "Creating labels" button simplifies printing onto the blank labels supplied with the display unit.



All product ranges have a different sheet reference and hence a different format.
An existing "*.doc" file can be opened or a new file can be created.

NOTE: **As each printer is configured with different margins, it is advisable to test printing on a sheet of paper before using a sheet of labels.**

The models can also be opened directly in "Microsoft WORD" without using XBT L100•.

Functional links

Creating links

Links are objects displayed on screen which are used to allocate functions to the and keys on the display unit keypad.

XBT N200	XBT N400	XBT NU400	XBT N401

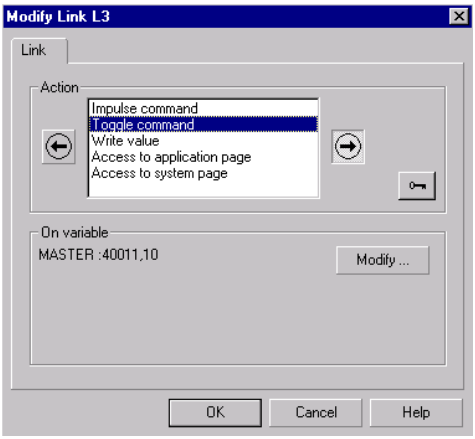
There are 2 types of links:
- Navigation links: for calling an application or system page
- Functional links of the following type:
  - impulse command
  - toggle command
  - write a value

1 to 2 links can be programmed per line (1 link maximum in each direction).

A link can be inserted if:
- the selected page is an application page
- the line where the cursor appears does not already have a link in both direction
- the space available for locating the cursor allows a link to be embedded (a functional link consists in two characters).
- the application language associated with the page currently being printed is the reference language

Configuration

This operation is performed by double-clicking on a functional link.



XBT N200	XBT N400	XBT NU400	XBT N401

NOTE: **For display units in "Control" mode, each page must only contain two navigation links (one in each direction) maximum (vertical scrolling not possible).**

XBT N200	XBT N400	XBT NU400	XBT N401

Introduction: Concepts

Man/machine dialogue between the Magelis display unit and the PLC consists of an exchange of data between the two devices.
With any communication application, define the following information:
- the data to be exchanged
- the protocol
- ...

The dialogue table is used to perform the main display functions:
- alarms from the control system (except XBT N200)
- send commands to the control system using the function keys
- signal the operator that a particular action has been authorized, by LEDs integrated in the keypad (XBT N401)

The dialogue table enables the control system to control the product as well as an operator:
- display a page
- change a variable field to input mode.

The dialogue table performs some functions that could be deemed secondary (secondary because their purpose is not to give instructions to the display unit or the pilot device), such as:
- terminal timesetting
- locking certain keys on the keypad
- etc

The dialogue table contains service information, such as:
- authorization to interpret a table
- communication monitoring

The dialogue table located in the PLC consists of "n" consecutive words (16-bit words). The number of words in the table depends on the choice of status data and commands to be processed during dialogue.
The XBT L100• program is used to make this selection.

XBT N200	XBT N400	XBT NU400	XBT N401
No indicator lights No alarm management	No indicator lights		Indicator lights

4. Dialogue table

The display unit reads and writes to a table in the PLC.
No PLC program needs to be written for the communication part.
On power-up or restarting communication, the display unit reads the command table and writes the status table.
In the event of a problem, the display unit informs the user with a message.

NOTE: **The "Authorization" word is used as a safety measure for the PLC. When this word has the incorrect value in the PLC, the display unit does not authorize writing of words of the dialog table to the PLC. It will not interpret the command words of the dialogue neither**

Exchanged data

The dialogue table is accessed cyclically in two phases: first a read phase, then a write phase. A few exceptions should be pointed out, for example the images of the function keys or the images of the keypad keys, which are updated immediately.

It is also important to note that the order of processing functions is the order in which functions are stored in the dialogue table, for either reading or writing: the function which is read first is the first to be processed, and the function which is written first is the first which has been processed (except for the key images).

The structure of a table is always as follows:

Block 1	Part containing the XBT -> PLC words
Block 2	Part containing the XBT <-> PLC words
Block 3	Part containing the XBT <- PLC words

->, <->, <- : direction of communication

From the viewpoint of the display unit, on each cycle there is:
1) a read phase: blocks 2 and 3 are retrieved
2) a write phase: blocks 1 and 2 are updated if necessary

XBT N200	XBT N400	XBT NU400	XBT N401

The notion of a block is extremely useful in certain protocols which allow what is known as optimization: instead of reading a series of words in the equipment word by word, they can be read in blocks, which is much faster.

Command data sent by the PLC to the display unit

This involves the following commands:

- Advanced functions
- Language of the terminal
- Display an application page
- Display alarm pages
- Lock keys
- Variable field entry request
- Control of indicator lights associated with the function keys
- Set the real-time clock command
- Table write authorization

Status data sent by the display unit to the PLC

This involves the following states:

- The display unit status
  - display unit configuration mode
  - confirmation of entries with the ENTER key
  - cancellation of an entry with the ESC key
  - cancellation of an entry after a time-out
  - Current language,
  - New time given by the operator
- The number of the page displayed
- The number of the last field entered
- The image of the keypad keys
- The real-time clock status (date and time)
- Communication monitoring
- The number of the last alarm to be acknowledged
- Checksum application,
- Advanced state of the terminal

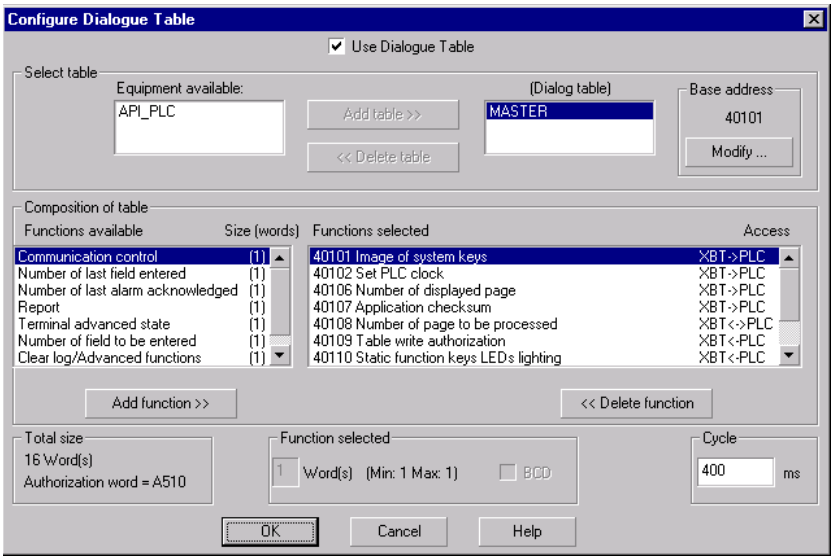
XBT N200	XBT N400	XBT NU400	XBT N401

Common data emitting/receiving

- Page number to be processed,
- Field number to be entered.

Configuring the dialogue table

This operation is performed by selecting ***Dialogue Table*** from the ***Configuration*** menu.



NOTE: **To use the dialogue table, check the "Dialogue Table" box.**

XBT N200	XBT N400	XBT NU400	XBT N401

4. Dialogue table

To use a dialogue table or an alarm table, the designer specifies the symbol for the equipment in which it will be located, as well as the basic address from which it starts.

NOTE: **Before starting to program the PLC, check that all the words needed for operation of the application are included in the dialogue table.**
The addition of words into the dialogue table requires the PLC program which pilots the application to be modified.

XBT N200	XBT N400	XBT NU400	XBT N401

5. Simulation

Introduction

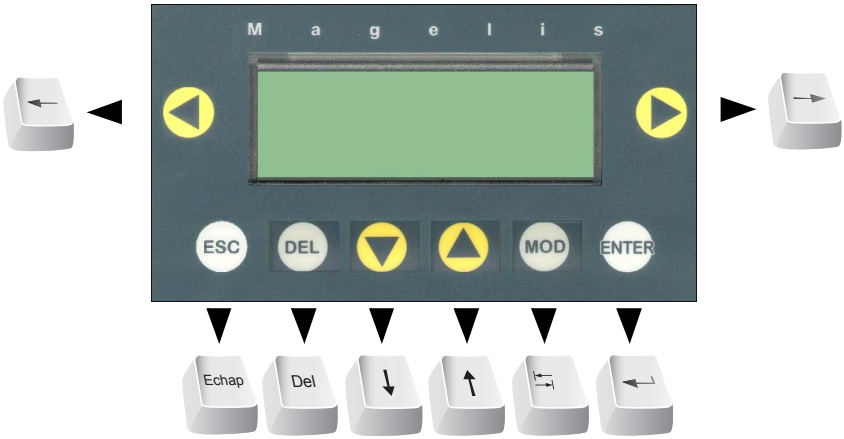
The purpose of simulation is to test the operation of the application in the XBT L100• and thus enable the designer to validate his application without needing to transfer it to the display unit or connect up the PLC. Only one simulation can be launched at a time.

Clicking on the ***Simulation Application*** entry in the ***Simulation*** menu opens two windows:

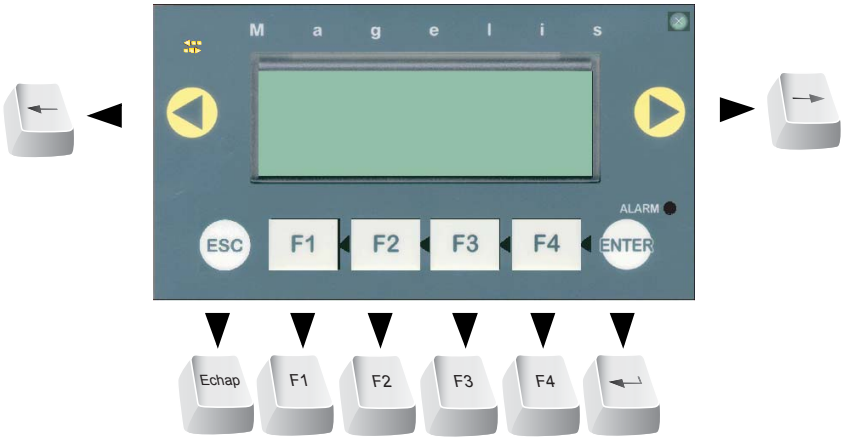
- one window representing the display unit front panel
- one PLC simulation window containing three tabs:
  - page variables
  - alarms
  - dialogue table

Display unit simulation window

This window represents the display front panel. It therefore contains a graphic representation of each of the keypad keys and a zone representing the screen where the pages are displayed as they appear on the terminal in run mode. Access to every key of the display unit keypad is possible using the mouse or a key of the PC keypad.



XBT N200	XBT N400	XBT NU400	XBT N401



This window does not have a menu, its size cannot be modified, nor can it be closed (it is closed at the same time as the PLC simulation window). Use [Alt] + [6] (digital block) on the front face, and click on L1000. The simulation changes to priority display.

PLC simulation window

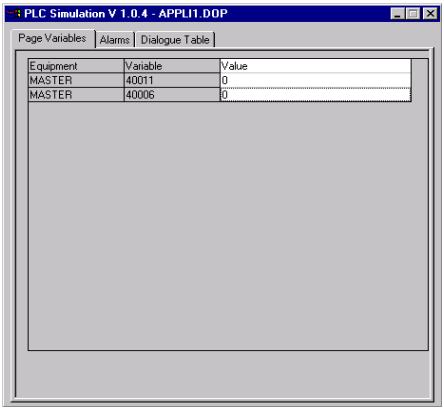
This window contains three tabs.

"Page variables" tab

This tab contains a grid consisting of 3 columns:

- The first column called "Equipment" contains the symbol for the equipment associated with the variable.
- A second column called "Reference" contains the variable address, and the syntax used therefore depends on the chosen protocol.
- A third column called "Value" contains the variable current value (in non-signed decimal and increasing order obligatory).

XBT N200	XBT N400	XBT NU400	XBT N401
No alarm management			

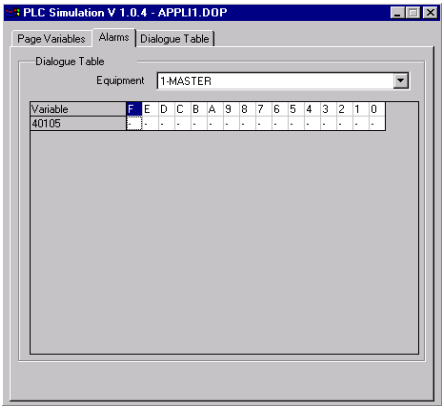


There is one line for each variable used in the page being displayed. If the same variable is used several times in the page, it only appears once in the grid.
It is possible to change the value of a variable by entering a new value in the box corresponding to the average of the PC keypad. Fields in read only appear once the display unit has entered an input.

"Alarms" tab

The grid representing the table of word bits used is similar to that used to create alarms. If the alarm bits are configured in the dialogue table, then this zone appears in green; if not, it appears grayed-out. In addition, the only active boxes are those corresponding to the bits on which alarms have been defined. These boxes display the value of the corresponding bit (0 or 1), and double-clicking on one of these boxes simulates the change of state of the alarm bit. An audible beep alerts the designer when he double-clicks on a box corresponding to a bit which is not associated with an alarm page (box not containing any information).

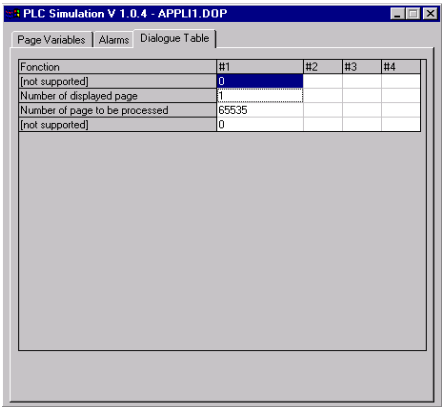
XBT N200	XBT N400	XBT NU400	XBT N401
No alarm management			



"Dialogue table" tab

The dialogue table simulation window represents the list of words used.

The value of these words can be modified.



XBT N200	XBT N400	XBT NU400	XBT N401
No alarm management			

6. Transferring an application

Connecting the display unit

For transfers, the link between the display unit and the PC uses an RS232C serial cable.
For more information on connections, see Chapter A, § Connection, page 8.

⚠ CAUTION

ELECTRICAL CONNECTIONS

- Connect the serial link connector with power off
- Connect only one type of serial communication at a time
- Thighten fixinbg screws.

Failure to follow this instruction can result in injury or equipment damage.

Starting up the display unit

Refer to the quick reference guide supplied with the product.

Importing an application

An application is imported by selecting ***Import*** from the ***Transfer*** menu.
Importing is into a new application, not into the current application.
Importing begins with checking the import protection (see § Step 2 - Configuring the terminal parameters, page 13).
Next, the XBT L100•/Connected display unit communication protocols are checked.
The import operation takes place after the checking phase.

Exporting an application

An application is exported by selecting ***Export*** from the ***Transfer*** menu.
The compatibility of the connected equipment and the transferred application is checked.
The export operation takes place after the checking phase.

XBT N200	XBT N400	XBT NU400	XBT N401

7. Description of the dialogue table words

The number of words in the table depends on the choice of status data and commands you wish to process during dialogue (see § 4. Dialogue table, page 43).

Similarly, the number of words available depends on the type of display unit (function keys present or not for example).

The description below gives the content of the various words in the dialogue table:

Size	Functions	Exchange	Page
1 word	Image of static function keys	XBT -> PLC	C55
1 word	Image of system keys	XBT -> PLC	C55
1 word	Image of numeric keys	XBT -> PLC	C55
1 word	Communication control	XBT -> PLC	C56
4 words	Set PLC clock	XBT -> PLC	C57
1 word	Number of displayed page	XBT -> PLC	C58
1 word	Number of last field entered	XBT -> PLC	C58
1 word	Number of last alarm acknowledged	XBT -> PLC	C59
1 word	Report	XBT -> PLC	C59
1 word	Application checksum	XBT -> PLC	C60
1 word	Terminal advanced state	XBT -> PLC	C60
1 word	Number of page to be processed	XBT<->PLC	C61
1 word	Number of field to be entered	XBT<->PLC	C62

XBT N200	XBT N400	XBT NU400	XBT N401

7. Description of the dialogue table words

Size	Functions	Exchange	Page
1 word	Table write authorization	XBT <- PLC	C64
1 word	Clear log/Advanced functions	XBT <- PLC	C65
1 word	Static function key LEDs lighting	XBT <- PLC	C67
1 word	Static function keys locking	XBT <- PLC	C68
1 word	System keys locking	XBT <- PLC	C68
1 word	Numeric keys locking	XBT <- PLC	C68
1 word	Terminal language	XBT <- PLC	C69
16 words	Alarm table	XBT <- PLC	C70
4 words	Set terminal clock	XBT <- PLC	C71

PLC: programmable logic controller
the "->","<->" or "<-" arrows specify the direction in which the information is travelling.
XBT -> PLC: Writing by the display unit of one or more words to the equipment chosen for the dialogue table.
XBT <-> PLC: Writing by the display unit of one or more words to the equipment chosen for the dialogue table, then writing of a report.
XBT <- PLC: Reading by the display unit of one or more words in the equipment chosen for the dialogue table.

XBT N200	XBT N400	XBT NU400	XBT N401

Detailed description

Images of the static/system/numeric function keys

Bit at 1 = key pressed (impulse command).
Bit at 1 = key press memorized (toggle command).

	Static function keys		System keys		Numeric keys
Bit	Image of	Bit	Image of	Bit	Image of
0	F1	0		0	reserved (0)
1	F2	1		1	reserved (0)
2	F3	2		2	reserved (0)
3	F4	3		3	reserved (0)
4	reserved (0)	4		4	reserved (0)
5	reserved (0)	5	reserved (0)	5	reserved (0)
6	reserved (0)	6	reserved (0)	6	reserved (0)
7	reserved (0)	7	reserved (0)	7	reserved (0)
8	reserved (0)	8	reserved (0)	8	reserved (0)
9	reserved (0)	9		9	reserved (0)
10	reserved (0)	10	reserved (0)	10	reserved (0)
11	reserved (0)	11	reserved (0)	11	reserved (0)
12	reserved (0)	12	reserved (0)	12	
13	reserved (0)	13		13	reserved (0)
14	reserved (0)	14	reserved (0)	14	reserved (0)
15	reserved (0)	15	global (1)	15	reserved (0)

XBT N200	XBT N400	XBT NU400	XBT N401
(1) This bit at 1 means that a key has been pressed. Management of this bit is independent from key locking.			

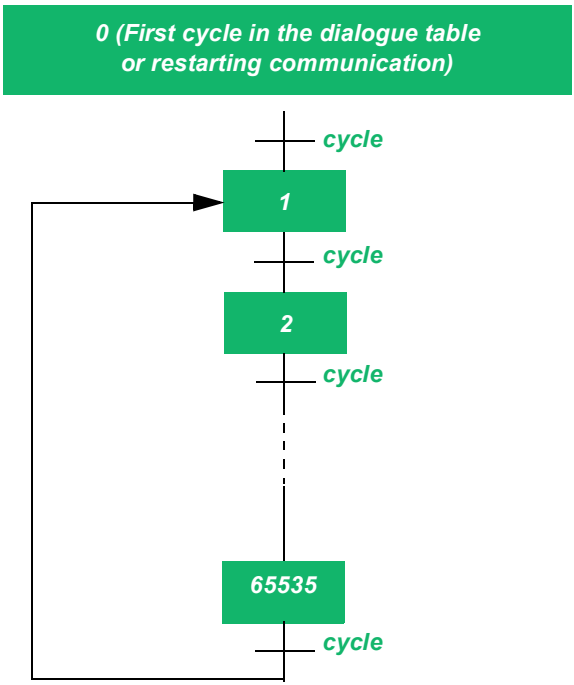
C

Communication control

This word is incremented at every dialogue table write cycle. When it reaches 65535 it does not pass through 0, but immediately takes the value 1.

XBT -> PLC	Communication control

The word can be used as a watchdog for the display unit: if it is not incremented regularly, it can be assumed that the display unit is no longer operational. Finally, this word can take the value 0 when the display unit is powered up And on any restarting communication. It never takes the value 0 thereafter: it can therefore be used by the synchronization pilot device to detect starting up of a display unit or on restarting communication.



XBT N200	XBT N400	XBT NU400	XBT N401

Set PLC clock

This set of words, each divided into 2 bytes, allows the control system to know the display unit time at each cycle so that, if necessary, its internal real-time clock can be updated.

XBT -> PLC	Seconds	Day of the week
XBT -> PLC	Hours	Minutes
XBT -> PLC	Month	Day
XBT -> PLC	Century	Year
Bit	15 8	7 0

The day of the week is encoded as follows:

1	Monday
2	Tuesday
3	Wednesday
4	Thursday
5	Friday
6	Saturday
7	Sunday

It is possible to choose in the XBT L100• configuration software how the various bytes are entered: either BCD format (in which case if it is fifteen hours, the content of the Hour field will be 0x15) or standard format (in which case if it is fifteen hours, the content of the Hour field will be 0x0F) can be chosen. The choice of BCD/Standard applies to all these four words, and cannot be made independently for each byte.

CAUTION

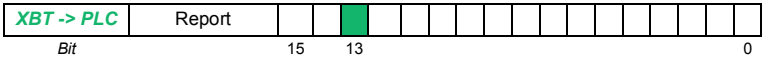
LOSS OF CONTROL

- Loss of communication between the display unit and PLC will result in partial or complete loss of control.
- Monitor display unit.
- Check "Communication control" word in dialogue table via PLC program

Failure to follow this instruction can result in injury or equipment damage.

XBT N200	XBT N400	XBT NU400	XBT N401

Note that to simplify timesetting management in the pilot device, a status word bit is assigned to this function.



Bit 13 changes to 1 in cases where the operator updates the time on the terminal.

Number of displayed page

This word contains the number of the page displayed on the terminal. The code of the page displayed follows the same rules as those which apply to the "Number of page to be processed" word, and in addition the following rule exists: the "Number of page displayed" word equals 0xFFFF in the following cases:

- When the display unit displays an alarm (1)
- When the display unit is in the processing of changing page

XBT -> PLC	Number of displayed page

Recommended method to display one page (see § Number of page to be processed, page 61).

Number of last field entered

This word contains the number of the last completed field. A field is considered to have been completed when it has been confirmed with ENTER, or as soon as the associated PLC value has been modified by the user (as is the case when the field is in immediate write mode). The field number is available in XBT L100•, via the ***Display/Field Numbers*** menu.

XBT -> PLC	Number of last field entered

Recommended method to control a field entry (see § Number of field to be entered, page 62).

XBT N200	XBT N400	XBT NU400	XBT N401
(1) No alarm management			

Number of last alarm acknowledged (1)

When the user acknowledges an alarm (by pressing the ENTER key on the display unit), the display unit sends the acknowledgement number to the equipment which generated the alarm. This number is valid during a cycle of the dialogue table; after it resets to -1. This alarm number is stored in a 16-bit word. This number is the significance of the bit associated with the alarm in its alarm table (see table below).

XBT -> PLC	Number of last alarm acknowledged

N° of bit	F	E	D	C	B	A	9	8
	16	15	14	13	12	11	10	9
	32	31	30	29	28	27	26	25
	...	...	...	...	...	...	...	...
	256	255	254	253	252	251	250	249

N° of bit	7	6	5	4	3	2	1	0
	8	7	6	5	4	3	2	1
	24	23	22	21	20	19	18	17
	...	...	...	...	...	...	...	...
	248	247	246	245	244	243	242	241

Report

This word is used bit by bit. Each bit has a precise meaning; see the paragraph on the corresponding word to obtain a detailed description of the function associated with each bit.

XBT -> PLC	Report																
Bit		15														0	

Bit no.	Bit name
0	CONFIDENTIAL_MODE
1	reserved (0)
2	END_OF_ENTRY_ON_ENTER
3	END_OF_ENTRY_ON_ESC
4	END_OF_ENTRY_ON_TIMEOUT

XBT N200	XBT N400	XBT NU400	XBT N401
(1) No alarm management			

Bit no.	Bit name
5	reserved (0)
6	reserved (0)
7	reserved (0)
8	reserved (0)
9	reserved (0)
10	reserved (0)
11	LOW_CURRENT_LANGUAGE_NUMBER
12	HIGH_CURRENT_LANGUAGE_NUMBER
13	NEW_TIME_PROVIDED_BY_OPERATOR
14	reserved (0)
15	reserved (0)

Application checksum

This word contains a checksum denoting the version of a dialogue application. It is only found in the dialogue table. The PLC can thus monitor that the dialogue application is the correct one.

XBT -> PLC	Application identification

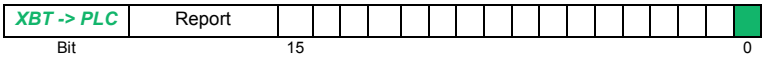
Terminal advanced state

This word is split into two bytes, the first of which is reserved and the second used bit by bit.

XBT -> PLC	Reserved equals 0	0	0	0	0	0	C	B	A
Bit	15 ... 8	7					2	1	0

***Current password level*:**
These three least significant bits (0 to 2) in the lower byte contain information relating to the display unit current password. Each bit is at 1 if the associated password is selected, and each bit is at 0 if the associated password is not selected.

XBT N200	XBT N400	XBT NU400	XBT N401
No checksum			



The advantage of this word is as follows: it enables the display unit password to be used as the password for the PLC (enabling, for example, to put the whole process into a certain state, for example maintenance, by means of the display unit, by entering the ad hoc password: the display unit can then have access to pages shared by a maintenance password, and the PLC can thus know that the display unit is in maintenance mode, enabling it in turn to switch to a mode where it is ready to accept modifications).

It should be noted that for reasons of compatibility with existing PLC applications, there is also a bit in the report word (the CONFIDENTIAL_MODE bit) which is at 1 as soon as at least one password has been confirmed.

Number of page to be processed

This 16-bit word contains the number of the page to be displayed. The content of this word should follow the rule below:

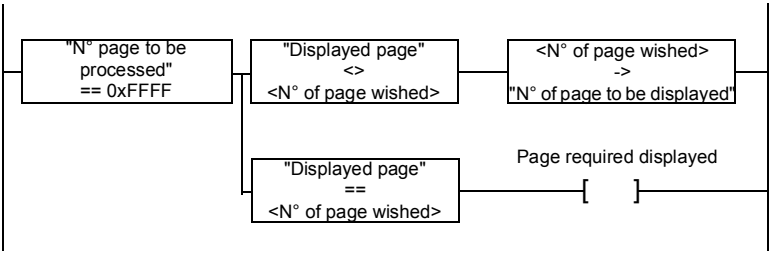
Content (N)	Meaning
1 to 64999	Display of the application page whose number is requested (N)
65420 to 65519	Display of the system page whose number is: in signed decimal: (-16-N) in non-signed decimal: (65520-N) in hexadecimal: (FFF0-N)

If the control system wishes to display page 45, it puts 45 in this word. If it wishes to display system page 2, it puts 65520-2=65518 in this word.

XBT N200	XBT N400	XBT NU400	XBT N401

XBT<->PLC	Number of page to be processed

Recommended method to display one page:



Number of field to be entered

This 16-bit word contains the number of the field to be completed. The content of this word should follow the rule below:

Content	Meaning
1 to 50	Change to input mode of the field in the current application page whose number is the requested value.

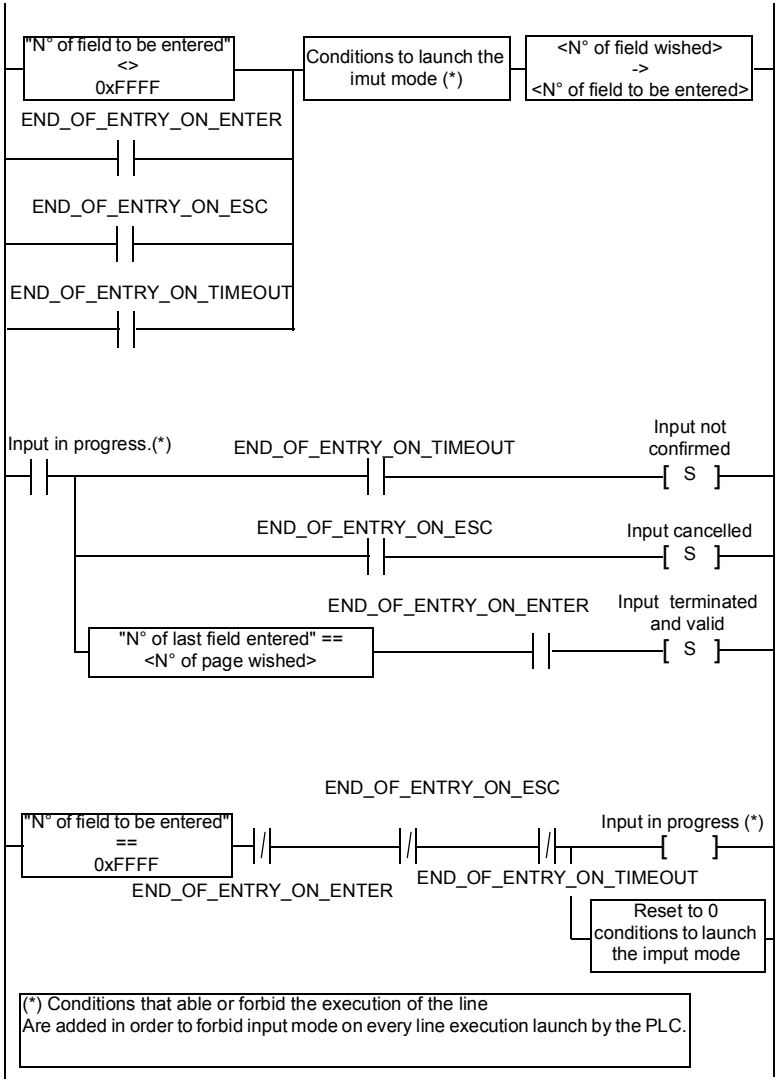
If the control system wishes field 37 to switch to input mode, it puts 37 in this word.

XBT<->PLC	Number of field to be entered

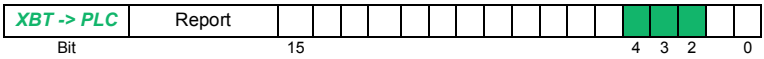
XBT N200	XBT N400	XBT NU400	XBT N401

7. Description of the dialogue table words

Recommended method to control a field entry:



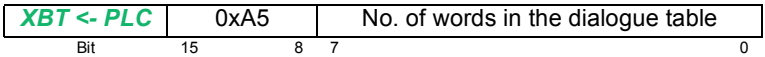
XBT N200	XBT N400	XBT NU400	XBT N401



- Bit 2: END_OF_ENTRY_ON_ENTER: set to 1 when the operator has confirmed completion of the field by pressing ENTER.
- Bit 3: END_OF_ENTRY_ON_ESC: set to 1 when the operator has cancelled completion of the field by pressing ESC.
- Bit 4: END_OF_ENTRY_ON_TIMEOUT: Set to 1 when the operator has neither confirmed nor cancelled completion of the field after one minute.

Table write authorization

This word consists of two parts: the 8 most significant bits should contain the value 0xA5, whereas the 8 least significant bits should contain the number of words in the dialogue table, in hexadecimal notation (hence, if the dialogue table contains 12 words, the value of the 8 least significant bits will be 0x0C, for example 16#A50C).



This word is a safety measure for the pilot device and for the display unit: unless this word has the expected value, the display unit will refrain from writing anything to the pilot device memory, and conversely, will refrain from interpreting the command words it might find in the dialogue table. The message "INCORRECT AUTHORIZATION TABLE" is displayed intermittently until the word is correct.

Note that there is no possible validity check for an alarm table not located in the pilot device.

XBT N200	XBT N400	XBT NU400	XBT N401

Clear log/Advanced functions

This 16-bit word is split into two bytes: the most significant byte is used to define what function is required of the display unit by the pilot device, and the least significant byte is used to switch the parameters to the function called by the most significant byte.

XBT <- PLC	Function code	Function data
Bit	15 8	7 0

The list of function codes and parameters supported are as follows:

Function		*Parameter*
1	Forces the backlight color	0 to 4 (XBT N401)
2	Forces the display unit password level	0 to 7

In cases where the pilot device might send the display unit a command:
- that is unspecified
- with incorrect parameters

the display unit simply ignores the command.

For functions 1 and 2, the pilot device has a check to ensure acknowledgement of its request via the 'Terminal advanced status' word in the write cycle of the DT following its request.

Function 1:
The backlight colors are defined as follows:

Color	*Function parameters (LSB)*
Unchanged	0
Red	1
Green	2
Orange	3
No backlight	4

XBT N200	XBT N400	XBT NU400	XBT N401
No backlight color selection			

If the dialogue table has not imposed a backlight color (because this function has never been called since the application started) or if the dialogue table has asked for the backlight color not to be forced (by setting the value 0x0100 in the 'advanced functions' word) then the backlight color is that imposed by the page displayed.

Function 2:
The password is defined as follows:

0	0	0	0	0	C	B	A
7							0

Password	*Function parameters (LSB)*
Unchanged/Reinitialization	0
A selected	1
B selected	2
B+A selected	3
C selected	4
C+A selected	5
C+B selected	6
C+B+A selected	7

If the dialogue table has not imposed a password (because this function has never been called since the application started) or if the dialogue table is not imposing a password (by setting the value 0x0200 in the 'Advanced functions' word) then the password level is that defined by the display unit user.
Conversely, if the dialogue table has asked at least once for the password to be either A+B (via the value 0x0203) then whatever the password requested by the user, the password level will be A+B, that imposed by the dialogue table (same logic as for other passwords).

XBT N200	XBT N400	XBT NU400	XBT N401

Static function key LEDs lighting

This word is used bit by bit, with each bit number i representing the state of the diode associated with the static function key i+1.

XBT <- PLC	Control of indicator lights

Bit	Role	Control Mode
0	(1) On/off (0)	F1 key
1	(1) On/off (0)	F2 key
2	(1) On/off (0)	F3 key
3	(1) On/off (0)	F4 key
4	reserved (0)	
5	reserved (0)	
6	reserved (0)	
7	reserved (0)	
8	reserved (0)	
9	reserved (0)	
10	reserved (0)	
11	reserved (0)	
12	reserved (0)	
13	reserved (0)	
14	reserved (0)	
15	reserved (0)	

C

XBT N200	XBT N400	XBT NU400	XBT N401
No indicator lights			"Control" mode only

7. Description of the dialogue table words

Static/system/numeric function keys locking

Each key on the display unit can be locked by the PLC. The dialogue table enables dialogue between the PLC and the display unit. In this table, words are reserved for locking the various keys in the form of a word bit: bit at 1 = key locked.

	SFK		System keys		Numeric keys
Bit	Locking of	Bit	Locking of	Bit	Locking of
0	F1	0		0	reserved (0)
1	F2	1		1	reserved (0)
2	F3	2		2	reserved (0)
3	F4	3		3	reserved (0)
4	reserved (0)	4		4	reserved (0)
5	reserved (0)	5	reserved (0)	5	reserved (0)
6	reserved (0)	6	reserved (0)	6	reserved (0)
7	reserved (0)	7	reserved (0)	7	reserved (0)
8	reserved (0)	8	reserved (0)	8	reserved (0)
9	reserved (0)	9		9	reserved (0)
10	reserved (0)	10	reserved (0)	10	reserved (0)
11	reserved (0)	11	reserved (0)	11	reserved (0)
12	reserved (0)	12	reserved (0)	12	
13	reserved (0)	13		13	reserved (0)
14	reserved (0)	14	reserved (0)	14	reserved (0)
15	reserved (0)	15	global (1)	15	reserved (0)

XBT N200	XBT N400	XBT NU400	XBT N401
(1) this bit is used to lock the whole keypad			

XBT <- PLC	Static function key locking
XBT <- PLC	System key locking
XBT <- PLC	Numeric key locking

When a key is locked, it can no longer have any effect at application program level: thus, for example, if the user has locked the ENTER key, the operator will not be able to confirm an entry by using ENTER.

Terminal language

This word forces the display unit to use language number N, N being a language number defined in XBT L100•.

XBT <- PLC	Display unit language

This word can take the following values:

Value	*Effect*
0	The dialogue table does not force any language
1 to N	Language number, as defined in the application
Other values	No effect: the display unit remains in the state it was in before this command was applied

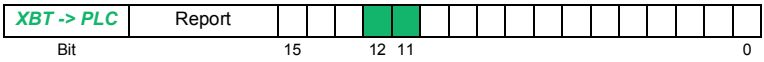
As long as this word equals 0x0000, any request to change the language on the part of the user will be accepted. However, as soon as a correct language number is imposed via the dialogue table, the user can no longer modify the display unit language.

Note that for reasons of compatibility with existing PLC applications, there are also two bits in the report word:
- Bit 11: LOW_CURRENT_LANGUAGE_NUMBER (LCLN)
- Bit 12: HIGH_CURRENT_LANGUAGE_NUMBER (HCLN)

which serve a dual purpose with this byte; these bits can be combined as follows:

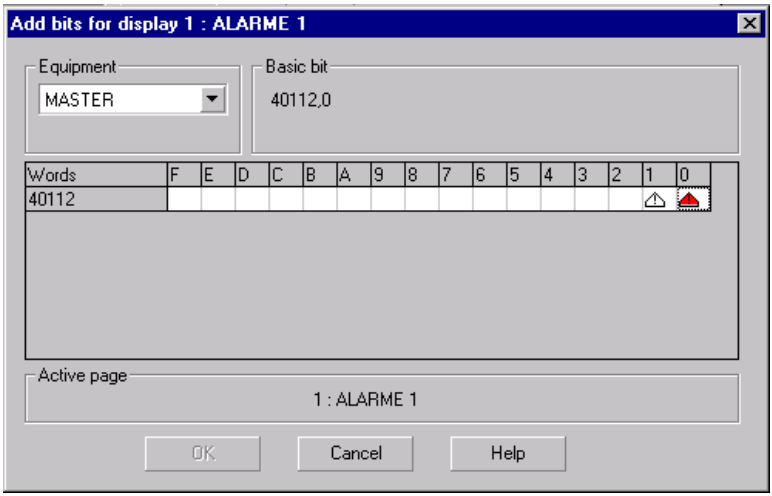
XBT N200	XBT N400	XBT NU400	XBT N401

HCLN	LCLN	Language
0	0	No. 1
0	1	No. 2
1	0	No. 3
1	1	Other



Alarm table (1)

There can be up to 256 alarms on the display unit, and these 256 alarms can be divided between several alarm tables located in the different equipment (max 15). The distribution granularity of these 256 alarms within the various alarm tables is 16 bits (the size of a word).



XBT N200	XBT N400	XBT NU400	XBT N401
(1) No alarm management			

Depending on the type of display unit, more or fewer alarms may be permitted. Nevertheless, the structure of a word used to signal alarms is always as follows: a 16-bit word, where each bit represents an alarm.

XBT <- PLC	Alarm															

When several alarm words are positioned in a device, the alarms are numbered bit by bit, starting with the least significant bit in the lowest order address (bearing the number 1) and going towards the most significant bit and the highest order address:

N° of bit	F	E	D	C	B	A	9	8
N° of alarm page	#16	#15	#14	#13	#12	#11	#10	#9
	#32	#31	#30	#29	#28	#27	#26	#25
	...	...	...	...	...	...	...	...
	#256	#255	#254	#253	#252	#251	#250	#249

N° of bit	7	6	5	4	3	2	1	0
N° of alarm page	#8	#7	#6	#5	#4	#3	#2	#1
	#24	#23	#22	#21	#20	#19	#18	#17
	...	...	...	...	...	...	...	...
	#248	#247	#246	#245	#244	#243	#242	#241

When several words are defined in a given device, these words are always located in consecutive adresses: there cannot be a gap between alarm number.

Set terminal clock

This set of 16-bit words, each divided into 2 bytes, enables the control system to update the display unit real-time clock.

XBT <- PLC	Seconds	Day of the week
XBT <- PLC	Hours	Minutes
XBT <- PLC	Month	Day
XBT <- PLC	Century	Year

XBT N200	XBT N400	XBT NU400	XBT N401

It is possible to choose in the XBT L100• configuration software how the various bytes are completed: either BCD format (in which case if it is fifteen hours, the content of the Hour field will be 0x15) or standard format (in which case if it is fifteen hours, the content of the Hour field will be 0x0F) can be chosen.

The choice of BCD/Standard applies to all these four words, and cannot be made independently for each byte. The 'Day of the week' field is not used by the display unit: the latter automatically calculates the right day associated with a given date. Irrespective of the content of the 'Day of the week' field, the display unit ignores it.

XBT N200	XBT N400	XBT NU400	XBT N401

Chapter D
Example of a simple application

When creating the example, you are guided through the process, the objective being to create your first application quickly.
Chapters B and C will give you all the information you need on the various actions.

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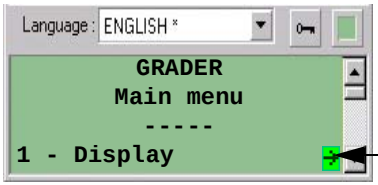
D

Contents

1. Application content

This application has been created for the XBT N401 display unit.
It includes seven application pages and two alarm pages.

Application page 1



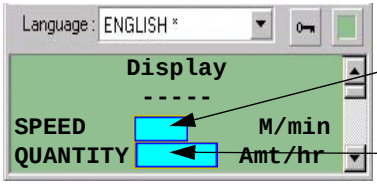
Calls page 2

x 2

Calls page 3

Calls page 4

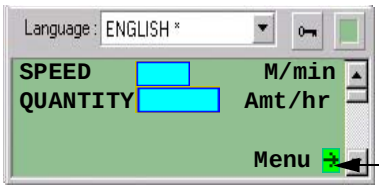
Application page 2



Read access to the numeric field of word %MW100

Read access to the numeric field of word %MW101

x 2

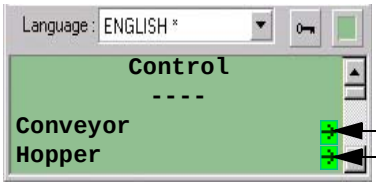


Calls page 1

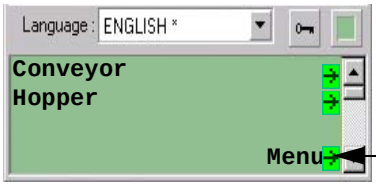
D

1. Application content

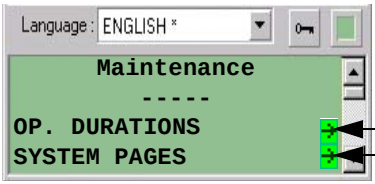
Application page 3



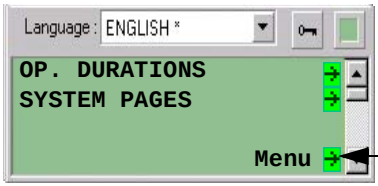
x 2



Application page 4

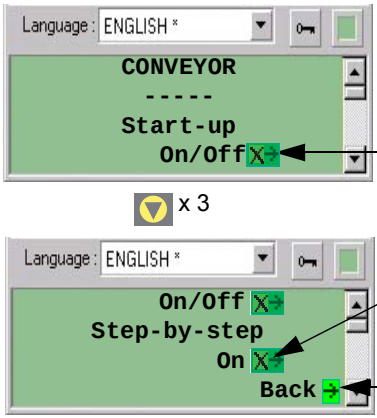


x 2

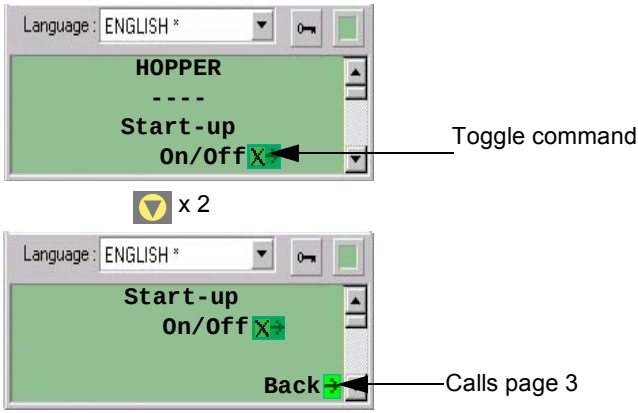


1. Application content

Application page 5

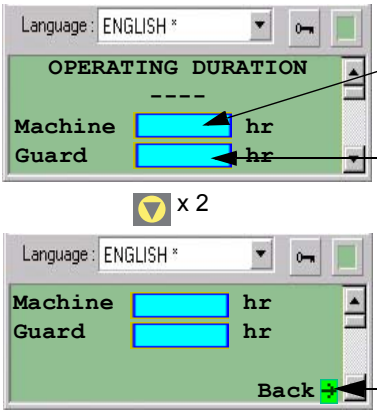


Application page 6



D

Application page 7

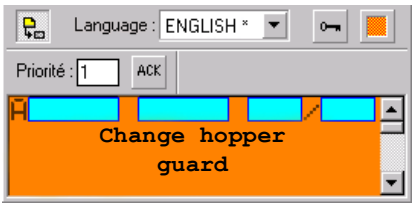


Read/write access to the numeric field of word %MW200

Read/write access to the numeric field of word %MW201

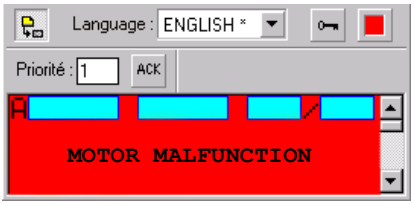
Calls page 4

Alarm page 1



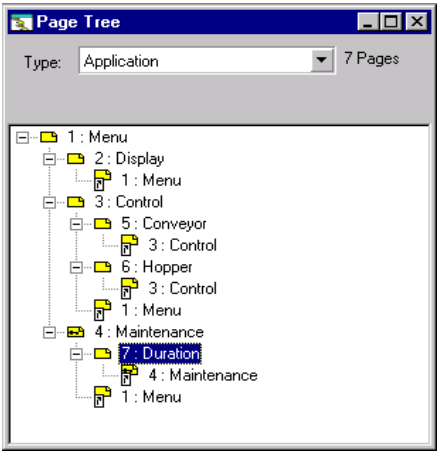
Page displayed when bit 0 of word %MW111 is at 1.

Alarm page 2



Page displayed when bit 4 of word %MW111 is at 1.

Page tree structure



Structuring the dialogue table

(see Chapter C, § 7. Description of the dialogue table words, page 53)

The dialogue table is configured with XBT L100• (see § Step 6 - Configuring the dialogue table, Page 18)

The list of words is as follows:

Word	*Exchange*
Image of system keys	XBT -> PLC
Set PLC clock	XBT -> PLC
Number of page displayed	XBT -> PLC
Application checksum	XBT -> PLC
Number of page to be processed	XBT<->PLC
Write table authorization	XBT<->PLC
Terminal language	XBT <- PLC
Alarm table	XBT <- PLC
Set terminal clock	XBT <- PLC

Step 1: Creating the application

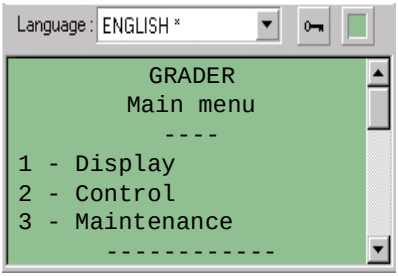
1. Launch XBT L100•.
2. Create a new application as indicated in the document. (see Chapter C, § Creating a new application, page 11).
3. In the display unit type selection window, select an input mode XBT N401 (***XBT N401(2)***).
4. Select Modbus protocol (and tick the IEC1131 box) and confirm by clicking on OK.

Step 2: Creating the equipment

1. From the ***Configuration*** menu, select the ***Equipment Symbol*** command.
2. Click on the ***Add...*** button.
3. Indicate a symbol name (eg: API_PLC) then indicate an address (eg: 2).
4. Confirm by clicking on OK.

Step 3: Creating application pages

1. The page editor displays page 1, enter the text for this page:

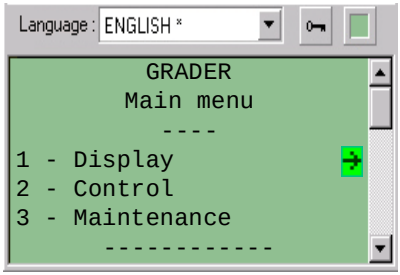


It is possible to center certain lines by selecting them and clicking on the button.

Now create the links to other pages.

First, go to the place you wish the link to appear (for example on line "1 - Display").

Next, to create a link:
- Select the ***Insert Link*** command from the ***Edit*** menu (link on the right by default).
- In "Action", select "Access to application page".
- Click on the ***New...*** button.
- Confirm the default page number (2) by clicking on ***OK***.
- Confirm by clicking on OK in page "Insert link "

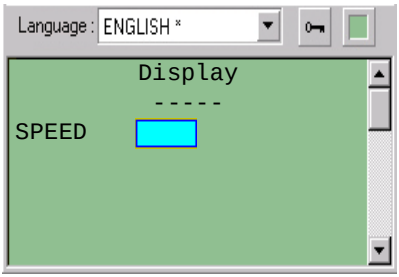


Do the same on line "2 - Control" (page 3).

To create a link on line "3 - Maintenance":
- Select the ***Insert Link*** command from the ***Edit*** menu (link on the right by default).
- In "Action", select "Access to application page".
- Click on the ***New...*** button.
- Click on the ***Protection*** button.
- Click on the ***Access by password*** check box and then on the ***Access enabled A*** box. Keep the default password, ie. "1111".
- Confirm by clicking on ***OK*** in page "protection".
- Confirm by clicking on OK in page "new page"
- Confirm by clicking on OK in page "insert link 3"

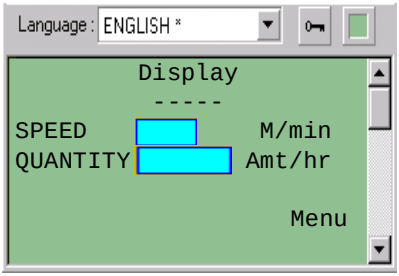
In the navigation window (see Chapter C, § Navigation window, page 8), click on "Page 2" in order to enter the content of this page.

2. The page editor displays page 2, enter the text for this page:



To create the variable field:
- Click on the icon.
- Click on ***Modify...***.
- Modify the equipment in API_PLC.
- Modify the word number by entering 100 in the "i" field.
- Confirm by clicking on ***OK***.
- Change the field length to 3.
- Confirm the field by clicking on ***OK.***

Enter the following lines:.



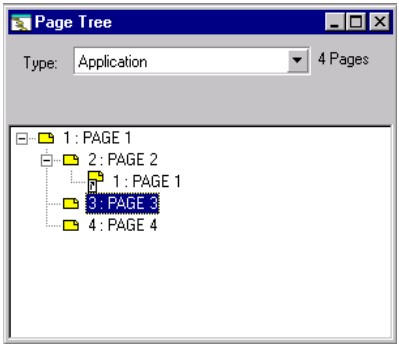
To create the second variable field:
- Click on the icon.
- Click on ***Modify...***.
- Modify the equipment in API_PLC.
- Modify the word number by entering 101 in the "i" field.
- Confirm by clicking on ***OK***.
- Confirm the field by clicking on ***OK***.

Now create a link to go back to the main page.

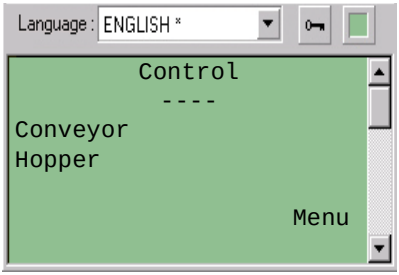
To create the link:

- Select the ***Insert Link*** command from the ***Edit*** menu (link on the right by default).
- In "Action", select "Access to application page".
- In the pages, select page 1.
- Confirm by clicking on ***OK***.

In the page navigation window, click on "Page 3" in order to enter the content of this page.



3. The page editor displays page 3, enter the text for this page:



Now create the links to other pages.

- Position the cursor on the "Conveyor" line.
- Select the ***Insert Link*** command from the ***Edit*** menu (link on the right by default).
- In "Action", select "Access to application page".
- Click on button ***Protection***.
- Click on checkbox "Access with password".
- Click on ***OK*** to confirm the protection page.
- Click on the ***New...*** button.
- Confirm by clicking on ***OK*** in page "Insert Link L1"
- Confirm the default page number (5) by clicking on ***OK***.
- Position the cursor on the "Hopper" line.

- Select the ***Insert Link*** command from the ***Edit*** menu (link on the right by default).
- In "Action", select "Access to application page".
- Click on the ***New...*** button.
- Confirm the default page number (6) by clicking on ***OK***.
- Confirm by clicking on ***OK*** in page "Insert Link L2"

To create the link to return to the main menu:

- Select the ***Insert Link*** command from the ***Edit*** menu (link on the right by default).
- In "Action", select "Access to application page".
- In the pages, select page 1.
- Confirm by clicking on ***OK***.

In the page navigation window, click on "Page 5" in order to enter the content of this page.

4. The page editor displays page 5, enter the text for this page:

To create the link to return to the previous page:

- Select the ***Insert Link*** command from the ***Edit*** menu (link on the right by default).
- In "Action", select "Access to application page".
- In the pages, select page 3.

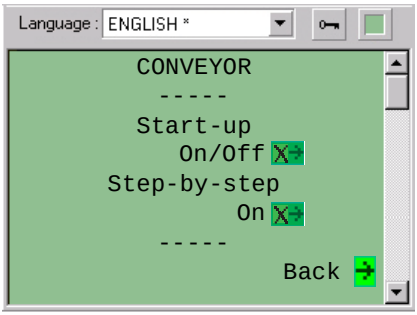
- Confirm by clicking on ***OK***.

This page includes functional command links (see Chapter B, § Commands sent via functional links, page 29).

To create a functional command link for Start-up:
- Select the ***Insert Link*** command from the ***Edit*** menu (link on the right by default).
- In "Action", select "Toggle command".
- Click on the ***Modify...*** button.
- Modify the equipment in API_PLC.
- Modify the word number by entering 10 in the "i" field and 10 in the "j" field.
- Confirm variable by clicking on ***OK***.
- Confirm by clicking on ***OK*** in page "Insert Link L2".

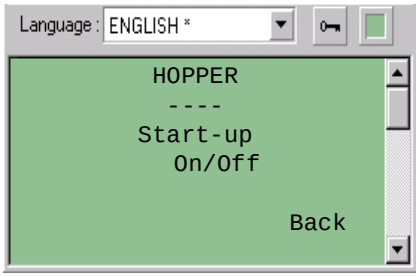
To create a functional command link for Step-by-step mode:
- Select the ***Insert Link*** command from the ***Edit*** menu (link on the right by default).
- In "Action", select "Impulse command".
- Click on the ***Modify...*** button.
- Modify the equipment in API_PLC.
- Modify the word number by entering 15 in the "i" field and 15 in the "j" field.
- Confirm variable by clicking on ***OK***.

- Confirm by clicking on ***OK*** in page "Insert Link L3".



In the page navigation window, click on "Page 6" in order to enter the content of this page.

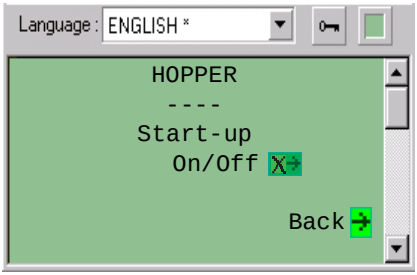
5. The page editor displays page 6, enter the text for this page:



To create the link to return to the previous page:
- Select the ***Insert Link*** command from the ***Edit*** menu (link on the right by default).
- In "Action", select "Access to application page".
- In the pages, select page 3.
- Confirm by clicking on ***OK***.

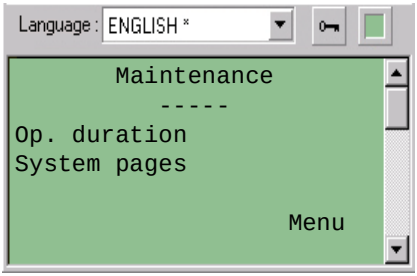
To create a functional command link for Start-up:
- Select the ***Insert Link*** command from the ***Edit*** menu (link on the right by default).
- In "Action", select "Toggle command".
- Click on the ***Modify...*** button.
- Modify the equipment in API_PLC.
- Modify the word number by entering 50 in the "i" field and 10 in the "j" field.
- Confirm variable by clicking on ***OK***.

- Confirm by clicking on ***OK*** in page "Insert Link L2".



In the page navigation window, click on "Page 4" in order to enter the content of this page.

6. The page editor displays page 4, enter the text for this page:



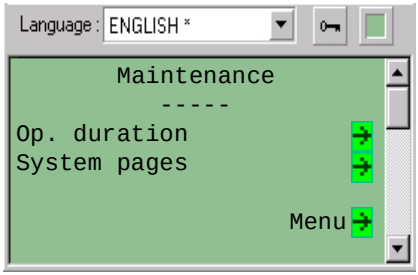
To create the links:
- Position the cursor on the "Op. duration" line.
- Select the ***Insert Link*** command from the ***Edit*** menu (link on the right by default).
- In "Action", select "Access to application page".
- Click on the ***New...*** button.
- Confirm the default page number (7) by clicking on ***OK***.
- Confirm by clicking on ***OK*** in page "Insert Link L1".

The next link is a link to a system page:
- Position the cursor on the "System pages" line.
- Select the ***Insert Link*** command from the ***Edit*** menu (link on the right by default).
- In "Action", select "Access to system page".
- In the pages, select "1: Menu".
- Confirm by clicking on ***OK***.

To create the link to return to the main menu:
- Select the ***Insert Link*** command from the ***Edit*** menu (link on the right

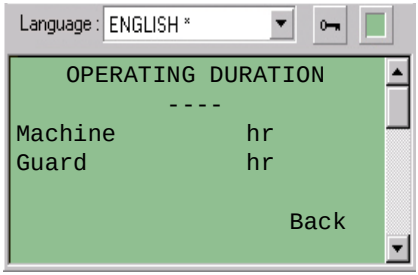
D

by default).
- In "Action", select "Access to application page".
- In the pages, select page 1.
- Confirm by clicking on ***OK***.



In the page navigation window, click on "Page 7" in order to enter the content of this page.

7. The page editor displays page 7, enter the text for this page:

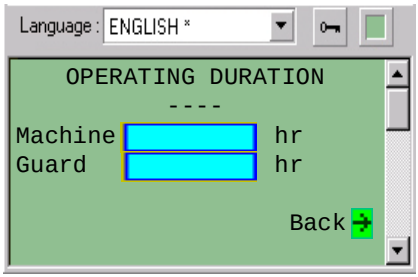


To create the first variable field:
- Click on the icon.
- Click on ***Modify...***.
- Modify the equipment in API_PLC.
- Modify the word number by entering 200 in the "i" field.
- Confirm by clicking on ***OK***
- Click on ***Options***.
- In "Access" select "Read/Write".
- Click on ***General***.
- Change the field length to 7.
- Confirm the field by clicking on ***OK***.

To create the second variable field:
- Click on the icon.
- Click on ***Modify...***.
- Modify the equipment in API_PLC.

- Modify the word number by entering 201 in the "i" field.
- Confirm by clicking on ***OK***.
- Click on ***Options***.
- Select "Read/Write".
- In "Access" click on ***General***.
- Change the field length to 7.
- Confirm the field by clicking on ***OK***.

To create the link to return to the previous page:
- Select the ***Insert Link*** command from the ***Edit*** menu (link on the right by default).
- In "Action", select "Access to application page".
- In the pages, select page 4.
- Confirm by clicking on ***OK***.



Step 4: Configuring the dialogue table

To configure the dialogue table
- Select the ***Dialogue table*** command from the ***Configuration*** menu.
- Check the "Dialog table" box.
- Check that these functions are selected:
  - *Image of system keys*
  - *Set PLC clock*
  - *Number of page displayed*
  - *Application checksum*
  - *Number of page to be processed*
  - *Write table authorization*
  - *Terminal language*
  - *Alarm table*
  - *Set terminal clock*

  If not, use the ***Delete functions***/***Add functions*** buttons to define the dialogue table in accordance with the above list.

To declare the PLC dialogue table start address, click on the ***Modify...*** button in the "Base address " zone and enter 500 in the "i" field. Confirm by clicking on the ***OK*** button.
Click on ***OK*** to confirm the configuration of the dialogue table.

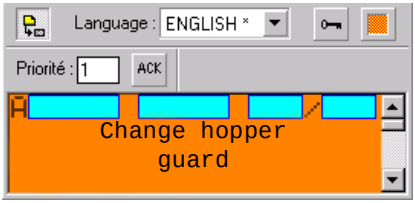
Step 5: Creating alarm pages

1. Click on the icon to bring up the "New Alarm Page" window.

2. Change the backlight color to orange by clicking on the check box "Orange" of the "backlight".

3. Click on ***OK*** to associate the page and the bit %MW510:X0 (selected by default). This word is allotted on configuring the dialogue table

4. Enter the following text:



As the first line on this page has already been created and reserved for timestamping alarms, enter the alarm text starting at line 2.

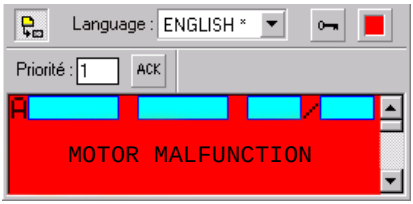
5. Create another alarm page as explained in point 1.

6. Change the backlight color to red.

7. Click on the ***Modify...*** button. Select the alarm activation bit (eg: bit 4) and confirm by clicking on ***OK***.

8. Confirm by clicking on ***OK***.

9. Enter the following text:



Step 6: Configuring the display unit

You wish page 2 to be displayed when the display unit is switched on:
- Click on the ***Terminal Parameters*** command from the ***Configuration*** menu.
- In the "Default page" zone, select page 2.
- Confirm by clicking on ***OK***.

Step 7: Saving the application

Save the application by using the ***Save*** command from the ***File*** menu (name: N401_2_m.dop (m for Modbus)).

Etape 8: Application simulation

Verify the application by using the ***Simulation application*** command from the ***Simulation*** menu

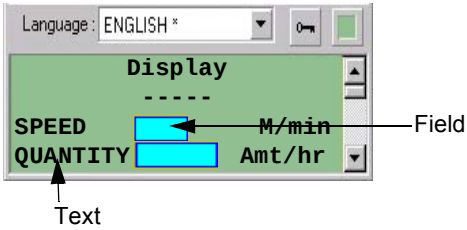
3. Loading the application into the display unit

The steps to load an application into a display unit are:

1. Check that the display unit is powered off.
2. Connect the PC to the terminal (see Chapter A, § Connection, page 8).
3. Power up the display unit.
4. Select the ***Export*** command from the ***Transfer*** menu to transfer the application to the display unit (see Chapter C, § 6. Transferring an application, page 52).

Reminder

A page consists of text and fields. A field can correspond to values which need to be read (read mode), entered (write mode) or both (read/write mode), either by the operator, or by the PLC.



Entry principle

In input mode the MOD key is used for entry. All the digits in the selected field blink.

D

Entry using the arrow keys

- Go to the digit to be entered using the arrow keys. Once either key has been pressed, only the selected digit blinks.

- Increment/Decrement the value of the selected digit using the arrow keys.

- Go to the next digit using the arrow keys.

- Confirm the entry globally with Enter.

Deleting characters

The DEL key deletes the digit or clears the selected field.

4. Using the application with the display unit

Chapter E
Appendices

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Troubleshooting, error messages, terminology:

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Contents

1. Troubleshooting/problems and solutions

Fault	Cause	Remedy
"Dialogue table reading impossible" message displayed on terminal	The equipment declared for the dialogue table does not exist	Modify the list of equipment and check the declared addresses
	No memory allocation for the dialogue table has been declared in the PLC	Allocate memory space for the dialogue table in the PLC (eg: %MW100 to %MW125)
	The equipment is not connected to the terminal	Check the connection
"?????" displayed rather than any values	No memory allocation for this variable has been declared in the PLC	Allocate memory space for the variable
	The equipment declared for the variable does not exist	Modify the list of equipment and check the declared addresses
	The equipment is not connected to the terminal	Check the connection
"Incorrect dialogue table authorization" message	The value of the authorization word stored in the PLC is not correct	Using XBT L100•, check the expected value (…\Configuration\Dialogue table) and its location in the equipment.
Product "dead"	XBT N401/NU400: No 24V power supply	Check the power supply
	XBT N200/400: No power supply via the PC mouse port. "Dialogue table" imposes backlight switched off. No power supply through the communication port of the PLC in run mode	Check whether the PC mouse port has been activated (see PC Control Panel). Check the PLC program. Check that the cable is connected to the PLC port Check that the PLC is power supplied
"Impossible to read/write variables" message	The equipment declared for the variable does not exist	Check the addresses declared for the equipment
	The variable does not have a valid address in the declared device	Check the variable address
	The equipment is not connected to the terminal	Check the connection
XBT--> PC import impossible	Application protected by password	Ask the creator of the application for the password
Inoperative keys	Locking by the dialogue table	Check the PLC program
Message "No Application"	No Application	Transfer an application

E

2. Error messages

System messages generated by the XBT (single-language system messages: English), non-configurable.

WIRING FAULT: Wiring problem.

WAITING FOR TRANSFER: Awaiting remote loading.

NO APPLICATION: Product has no application.

DOWNLOAD IN PROGRESS: Download to the XBT in progress.

DOWNLOAD ABORTED: Download to the XBT cancelled by the operator.

DOWNLOAD FAILED: Download to the XBT failed.

DOWNLOAD COMPLETED: Download to the XBT finished.

UPLOAD IN PROGRESS: Upload to the PC in progress.

UPLOAD ABORTED: Upload to the PC cancelled by the operator.

UPLOAD FAILED: Upload to the PC failed.

UPLOAD COMPLETED: Upload to the PC finished.

APPLICATION FAULT: Application error (inconsistency).

SWITCH POWER OFF CS:x IP:x: Fatal terminal error, consult Schneider Electric.

AUTOTEST IN PROGRESS: Autotests running.

CHECKSUM FAILED: Firmware checking error.

BIOS ERROR # x CS:x IP:x: Fatal BIOS error, consult Schneider Electric.

PROCESSOR TRAP # x CS:x IP:x: Fatal terminal error, consult Schneider Electric.

RUNTIME ERROR # x CS:x IP:x: Fatal RUNTIME error, consult Schneider Electric.

FPU ERROR # function x: Fatal error of the mathematics libraries, consult Schneider Electric.

KERNEL TRAP #x ES:x IP:x: Fatal error of the real-time kernel, consult Schneider Electric.

2. Error messages

XBT system messages (5 languages) which can be translated by the XBT L100• in the system pages.

INCORRECT DIALOGUE TABLE AUTHORIZATION: Authorization word is incorrect.

DIALOGUE TABLE WRITING IMPOSSIBLE: Writing to a protected zone or XBT <-> PLC connection problems.

DIALOGUE TABLE READING: Connection problems between XBT <-> PLC.

CONNECTION IN PROGRESS: XBT is trying to connect to the PLC.

IMPOSSIBLE TO READ VARIABLE: Variable cannot be read.

IMPOSSIBLE TO WRITE VARIABLE: Variable cannot be written.

OVERFLOW MIN <= VALUE <= MAX: Entry of a value which is outside the limits.

ALARM LIST EMPTY: No alarms in the terminal.

TIME FORMAT INVALID: The time cannot be displayed because of its format.

DATE FORMAT INVALID: The date cannot be displayed because of its format.

WRONG PASSWORD: Entry of an incorrect password.

PAGE DOES NOT EXIST: Call-up of a non-existent page.

LANGUAGE IMPOSED BY THE PLC: Current language determined by the PLC.

LANGUAGE DOES NOT EXIST: Language not entered in the XBT.

PASSWORD IMPOSED BY THE PLC: Current password determined by the PLC.

PROTECTED ACCESS PAGE: Call-up of a page protected by password.

Variable	Type	Description
%MW50000	String	Date in ASCII
%MW50001	String	Time in ASCII
%MW50002	Word	Seconds (0 to 59)
%MW50003	Word	Minutes (0 to 59)
%MW50010 to %MW50056	Word	Free word
%MW50057	Word	Quick increment from 0 to 65535
%MW50058	Word	Quick Decrement from 65535 to 0
%MW50059	Word	Increment from 0 to 9 every 2 seconds
%MW50060	Word	Decrement from 9 to 0 every 2 seconds
%MW10028	Word	Value of the programmed language
%MW10033	String	Password level in progress
%MW10034	String	Password entry in progress
%MW10035	Word	Reset current password value (=0 for Reset).

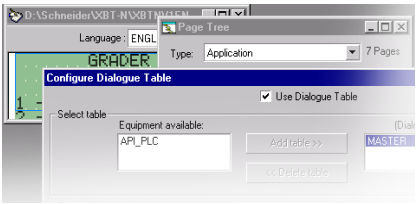
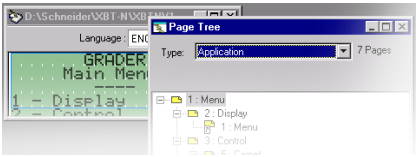
4. Terminology

Term used	Definition
Alarm page	Page of information which can be displayed at the request of the control system by acting on the Boolean variable associated with it.
Alarm table (AT)	Part of the dialogue table completed by a control system. This word list associates a word bit with an alarm. The alarm table enables a device to signal alarms to the terminal, and to know in return when the operator has acknowledged each alarm. The alarm table for the pilot equipment is a subset of the dialogue table.
Alphanumeric display units	These are only capable of displaying characters (with a font resolution usually 5x7 pixels). The characters are physically separated from one another.
Alphanumeric terminals	These are equipped with alphanumeric display units or matrix display units used in character mode only.
API	French translation of PLC
Application language	An application can be created in several languages, and each of these languages is an application language.
Application page	Defined by the developer, this can be displayed by the operator or by the control system. It contains static text and possibly static graphics, variable fields and links.
AT	Acronym for alarm table (see this word)
Bitmap	Image with fixed dimensions which can be handled by a Windows application.
Button	Windows object used to perform the action described by its name (or symbol). A button is enabled by clicking the mouse or pressing Enter when it is selected.
Combo box	Windows object consisting of an edit field and a list box
Command table	Part of the dialogue table completed by the control system. This word list contains all the instructions passed to the terminal.
Configuration software	Tool used to develop an operator dialogue application and also transfer it to a target terminal.
Control system	Designates all the components of an automated installation: The control system (usually a PLC) controls the sensors, the actuators and the MMI terminal.
Current language	Language selected in the document bar; this is the language in which the developer is currently making modifications.
DaughterPage	Application page which can be called by a MotherPage.
Default language	Application language used when the XBT is powered up.

4. Terminology

Dialogue application	Set of data, necessary and sufficient to describe the behaviour of a terminal in running phase. XBT L100• is the only tool which can be used to create this type of application for Schneider Electric terminals.
Dialogue box (DB)	Particular type of window containing controls which enable data to be exchanged with the developer.
Dialogue table (DT)	Word list containing the necessary information for a control system to access the terminal man-machine dialogue functions. It consists of 3 parts called command table, alarm table and status table.
Document	Set of data forming a dialogue application in the XBT L100• program. This term is used for compatibility with the architecture recommended by Microsoft ©.
DT	Acronym for dialogue table (see this word)
Edit field	Windows object used to enter a character string from the keypad.
Equipment	Any device (usually a PLC) communicating with the terminal.
Firmware	This is the terminal on-board software. It comprises mainly the BIOS and the loader used to communicate with XBT L100•.
FolioPage	A Daughter Page but not a Mother Page. A page alias can be both Folio and Mother.
Installer	Qualified person must install this system.
Link	Object contained in a page used to access application pages or system pages (navigation links) or to perform command functions (command links).
List box	Windows object usually containing a scroll bar, used to select an item from a list.
Loader	Part of terminal Firmware responsible for handling communication with XBT L100• to transfer a dialogue application in one direction or another. Its role is also to store application data, sent by XBT L100•, in the terminal memory.
Loading	Action of reading a mass memory into the PC memory in order to use the data it contains.
Magelis	Generic trade name for all Schneider Electric operator terminals.
Matrix display units	These consist of a "continuous" matrix of pixels, enabling the display of characters in different fonts and sizes, and also elementary graphics. The technology and resolution of these display units is however too low for them to be considered true "graphic" display units.
Menu	Heading located in the menu bar, selected in order to access a list of entries.
Menu bar	Zone located at the top of a Windows window containing several headings corresponding to menus.

4. Terminology

Menu entry	Heading indicating a software function and selected to enable access to it. Also known as "Command".
Modal dialogue box 	While a modal dialogue box is open, the developer cannot perform any other operations in the XBT L100• program.
Modeless dialogue box 	The presence of a modeless dialogue box does not prevent any operations in the XBT L100• program.
Mother Page	Application page which has at least one DaughterPage.
NodePage	Application page which has a MotherPage and at least one DaughterPage.
Operator	Person who uses a terminal in run mode within a control system.
Page	Displayable on the terminal. It may be larger than the display unit. Scrolling is used to move the visible screen area. Pages can be different types, as listed below.
Page editor	Part of a document window used to edit the content of any type of page.
Pilot device	A terminal can communicate with several control system devices. Of these, only one is able to send commands to the terminal, and is capable of knowing its status; this equipment is called the pilot device. Contains the dialogue table.
PLC	Programmable Logic Controller
Protocol	Enables communication between the terminal and the connected equipment in several types of architecture.
Radio button	Windows object usually used in a group and enabling a single selection.
Transfer mode	Operating mode in which the target terminal and the PC running XBT L100• can communicate to transfer a dialogue application in one direction or the other.
Reference language	Language in which the manufacturer constructs his application pages. By default, it is the installation language of the XBT L100• program.
RootPage	A page which can be a MotherPage but not a DaughterPage.

4. Terminology

Run mode	Operating mode in which the terminal is communicating with one or more connected devices and is running an application.
Screen	Designates a terminal display unit. As a page can sometimes be bigger than the display unit, by extension the term screen also designates a subset of the page, this subset being the same size as the display unit.
Service keys	Keys on the keypad necessary for certain terminal functions (scrolling, selecting fields, data entry, requesting a menu, etc).
Shortcut menu	Quick method of displaying commands linked to a specific work situation.
Static function keys (SFK)	Keys used to access pages or perform command operations; their action does not vary regardless of the dialogue application context.
Status bar	Zone located at the bottom of a Windows window, used to indicate to the developer the state of the application or active element.
Status table	Part of the dialogue table completed by the terminal. This word list represents the terminal status.
Terminal	Component consisting of on-board software capable of functions designed for inclusion in a dialogue application to ensure a man/machine interface suitable for the process in which it is integrated.
Thumbwheel entry	Rudimentary input mode based on the same principle as mechanical thumbwheels: selection of the digit to be modified by means of the horizontal arrow key(s), then selection of the digit value by means of the vertical arrow key(s).
Toolbar	Zone of a Windows window usually located under the menu bar and containing buttons which can be activated by the mouse. The function associated with each button can also be accessed from the keypad (usually by a menu entry).
Tree structure	Structure representing the application pages and the links between them. By extension, this window is used to represent the structure of all types of page.
User	Operator who uses a terminal in run mode on site. This is the generic term used to designate any of the 3 profiles defined earlier: Developer, Installer, Operator
Variable field	Area on a terminal display unit configured to display an item depending on the value of an object in the connected control system.
Windows application	Program which runs in the Windows environment.
WYSIWYG	(What You See Is What You Get) Representation of a physical element on the PC screen which simulates its true appearance.

4. Terminology

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